

U.S. GOVERNMENT EVALUATION

INPUT



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Analysis and Evaluation  
of the  
U.S. Commercial Systems Integration  
Business for

**NIPPON  
TELEGRAPH AND TELEPHONE**



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By

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Z-NTT

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1988

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TITLE

EVALUATION

DATE  
LOANED

BORROWER'S NAME

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DAR

CAT. No. 23-108 PRINTED IN U. S. A.

# U.S. CSI STUDY PRESENTATION FOR NTT

May 20, 1988

A G E N D A

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- 9:00 Introduction
- 9:15 CSI Market Assessment
- 10:15 Customer Buying Process
- 10:45 Vendor Profiles
  - IBM
  - AA & Co.
  - EDS
  - ATT
- 12:00-1:30 Lunch
- 1:30 Vendor Profiles (Cont.)
  - Unisys
  - DEC
  - BCS
  - MMDS
  - CSC
  - CTG
  - SHL
- 3:00 Specialized CSI Vendors
- 3:30 Competitive Environment Findings
- 4:30 Multi-Vendor Integration Technology
- 5:00 Conclude

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## INTRODUCTION

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<https://archive.org/details/03270ZNTTxx88USCSIBusiness>

## INPUT CSI BACKGROUND

- 1980 Identified "SI" as part of Professional Services
- 1983 First SI report: "Systems Integration Markets in the U.S. Federal government"
- 1985 First Commercial SI report
  - Eight additional SI reports
  - Numerous proprietary studies
- 1987 Systems Integration Planning Service (SIPS) Launched

## NTT STUDY CHARACTERISTICS

### Our Experience:

- Very Challenging Project
- CSI has Many "Faces"
- Language/Terminology not Fully Established
- Some Patterns Emerging
- Dynamic Changes Occuring

### Our Commitment:

- INPUT is Honored to Advise NTT
- Assembled Strong Research Team
- High Quality Service
- Responsive to NTT's Needs

## NTT STUDY OBJECTIVES

- Provide Ten-Year CSI Market Forecast
- Identify Strengths, Weaknesses, and Strategies of Major CSI Vendors
- Recommend a NTT Strategy for the CSI Business

## PROJECT SCOPE

- Analysis of 11 Major Vendors
- Commercial, Not Government, Sector
- U.S. Market Only

## DELIVERABLES

- Written report
- Presentation

## IF POSSIBLE . . .

- Specialized CSI Vendors
- Multi-Vendor Integration Technology
- Competitor's Detailed CSI Proposal with Pricing, etc.

## **INPUT RESEARCH TEAM**

**Project Manager:**

**Dennis White**  
**Director ,Custom Research**

**Four Senior Consultants**

**Five Research Analysts**

**Project Locations:**

**Mountain View, CA**  
**Parsippany, NJ**

**Executive Review:**

**Dennis Wayson**  
**Vice President , Research**

**Peter Cunningham**  
**President**

**R. DENNIS WAYSON**  
**Vice President, Research**  
**INPUT**

**CAPABILITIES:**

- Member of INPUT's senior management
- Directs all U.S.-based research
- Twenty years of DP planning and management
- System development, operations management, technology planning and systems planning
- Worldwide user-based systems responsibility

**BACKGROUND:**

- Senior Vice President - Professional Support Systems for Bank of America
- Director of Information Systems Development and Technology for Sun Company
- Guest speaker for IBM and MIT
- Board member for MIT Center for Information Systems Research

**EDUCATION:**

- MS Operations Research & Computer Science, Cornell
- BS Engineering, Lehigh University

**DENNIS WHITE**  
**Director, Custom Research**  
**INPUT**

**CAPABILITIES:**

- Nineteen years experience
- Marketing and business strategy development, mergers and acquisitions
- Twelve vertical markets
- Venture capital startups, turnaround situations, medium-size public companies, and a Fortune 100 company

**BACKGROUND:**

- Director of Marketing for Boole & Babbage, Inc.
- Director of Marketing for Syntelligence, Inc.
- Vice President Marketing for Tymshare INSG
- Vice President Marketing for Tymnet
- Manager Strategic Planning for Tymshare
- Manager Business Planning for McDonnell Douglas Automation

**EDUCATION:**

- BS Engineering, Northwestern University
- MBA, Washington University (St. Louis)

**ALEX GRAHAM**  
**Principal Consultant,**  
**Telecommunications**  
**INPUT**

**CAPABILITIES:**

- Twenty years experience
- Systems development and management
- Voice and data network planning
- International network design and management
- Marketing of international network services

**BACKGROUND:**

- Independent Consultant—International Network/Systems Development
- Senior Consultant, Telecommunications, Arthur D. Little
- General Manager, Systems Operations (Far East) for Visa International
- Director, Corporate Data Center for Consolidated Freightways
- Manager Operations (Europe) for American Express Co.

**EDUCATION:**

- Undergraduate, Business Administration/Marketing
- Graduate, International Management

**MICHAEL COHN  
MAPS Program Manager  
INPUT**

**CAPABILITIES:**

- Twenty-three years experience
- Marketing, business strategy and planning, sales, support
- Knowledge of computer systems, printers, software, communications

**BACKGROUND:**

- Director, 3rd-Party Software for Imagen
- OEM Sales Manager for Imagen
- Director, Marketing Support for Imagen
- Director, Corporate Marketing for Prolink
- Market Planning Manager, Communications for Storage Technology
- Business Planning Manager, Communications for Storage Technology
- Marketing Support Manager for Tymshare
- Advanced Marketing Projects Manager for Tymshare
- Applications Consultant Manager for Tymshare
- Systems Programmer for Exxon Math and Systems
- Systems Engineer for IBM

**EDUCATION:**

- B.S. Engineering, Cooper Union
- M.S. Engineering, Northwestern University

**BRUCE P. HADBURG**  
**Senior Consultant**  
**INPUT**

**CAPABILITIES:**

- Nine years computer industry experience
- Business strategy and planning, marketing
- Knowledge of minicomputers, microcomputers, and video display terminals

**BACKGROUND:**

- Senior Analyst for Churchill International (venture capital)
- Product Manager for Wyse Technology
- Manager, Industry Marketing for Tolerant Systems
- Senior Analyst (Minicomputers) for Dataquest

**EDUCATION:**

- B.A. Economics, University of Pittsburgh
- M.B.A., Santa Clara University

## INPUT RESEARCH EFFORT

- Initiated February 1, 1988
- Reviewed Deliverables & Report Outline with NTT
- NTT Background Data
- CSI Information Sources:
  - Primary
  - Secondary
- Updated & Extended CSI Market Forecast
- Developed User & Vendor Questionnaires
- Searched & Identified CSI Projects
- Researched Vendor Data
- Surveyed 33 Users and 11 Vendors
- Tabulate and Analyse Results
- Develop Findings and Recommendations
- Report Findings & Recommendations

## USER SURVEY INFORMATION

- 30 Users
- Target Respondents: Manager of CSI Project
- Industry Emphasis
  - Discrete Manufacturing
  - Banking and Finance
  - Insurance
- Questionnaire
  - Ensured Consistent Responses
  - CSI Definitions Available for Interviewers
  - 40% "Open-Ended" Questions

## USER RESPONDENT ATTITUDES

- User Questionnaire Was Very Detailed;  
<20% Answered Every Question
- Respondents Were:
  - Knowledgeable
  - Honest

## **VENDOR SURVEY INFORMATION**

- 11 Vendors
- Covering All Areas
  - Hardware
  - Communications
  - Consulting
  - Aerospace/Data Service
  - Software
- 40 Page Questionnaire

## VENDOR RESPONSES

- More Cautious than Normal
  - Revenue
  - Profit Margins
  - Pricing Strategy
  - Other Strategy Issues
- Confusion Inside Vendors
- Required Secondary Sources
- Six of Eleven in Organizational Change

## **DEFINITIONS**

- Commercial Systems Integration:

**"Total Solution to a Multi-Disciplinary I.S. Requirement  
Provided Through a Single Vendor"**

**Excludes: Federal Government**

**Includes: State/Local Government**

**Excludes: In-House CSI Projects**

## INPUT CONVENTIONS

- Forecasts Shown in Current Dollars
- AAGR = Average Annual Growth Rate
- 10-Year Forecast Shows Relative Order of Magnitude, Not Exact Market Size

## CSI CAPABILITY DEFINITIONS

- Consulting Services – Project Front-End Feasibility Studies, and/or Hardware, Software, Network Technology Selection and Trade Off Studies.
- Design/Integration – System Design, Installation, and Testing.
- Project Management – Overall Responsibility for Project Planning, Implementation Vendor and User Interface.
- Information Systems Hardware – Processing CPUs, Storage and Related Peripherals Used in an SI Project (Mainframes, Minis, Micros).
- Communications Hardware – Communications Devices, e.g., Controllers, Switches, Multiplexers, Network Control Systems, PBXs.
- Software Development – Custom Software Design, Coding, and Testing.

## CSI CAPABILITY DEFINITIONS

- Package Application Software – Vendor-Provided, Off-the-Shelf Generic Software Solution to a System Requirement.
- Education, Training, & Documentation – Training Given to the User to Make Some Combination of the Use, Operation, and Maintenance of a System Possible by That User.
- Network Management – The Ongoing Operation, Monitoring, and Control of a Communications Network as a Facility Management Service.
- Service & Repair – Services That Fix Operational Problems in Hardware, Software, and any Special Facilities/Equipment.
- Other – Specialized Systems Required by, and Unique to, the SI Project Application. For Example, an Energy Management System for a Power Utility Will Have Special Controls and Switches (Using Computer Hardware & Software) Provided by Suppliers Not Normally Associated with the Data Processing Business.

## CSI MARKET ASSESSMENT



## CSI MARKETS

- Introduction
- User Perspective
- Vendor Perspective
- Expenditures by Project Components Groups
- Expenditures by Industry

## **MARKET CHARACTERISTICS**

- Mostly an Inhouse Market
- Users Not Well Informed
- Strategic Applications
- Includes: Problem Analysis, Solution Design, Implementation, Support
- Very High Level Buying Decision
- Relationship-Based Selling
- CSI Vendor Assumes Risk
- Niche Orientation
- Vendors in High State of Change

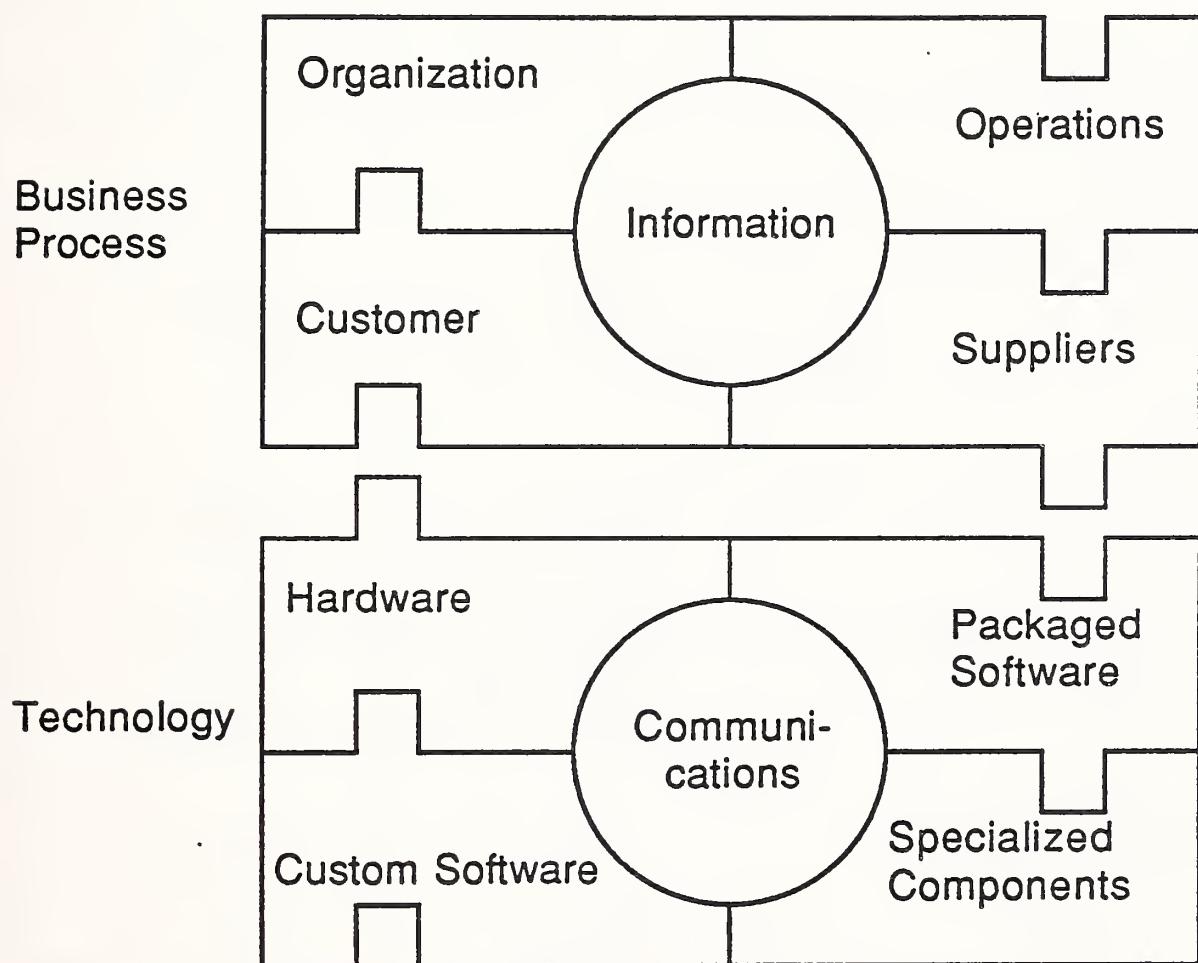
## CSI MARKET ASSESSMENT

- Commercial vs. Federal CSI
- Driving Forces
  - Users
  - Vendors
- User Views
  - CSI Projects
  - Vendor Selection
- Vendor Views
  - Project Staffing
- Market Forecasts
  - Project Component
  - Vertical Market

## WHAT IS THE "INTEGRATION" IN CSI?

- The Connection/Linkage of Systems or Components which were not designed to do so
- Three Primary INTEGRATION Levels:
  - Application
  - Data
  - Network

## EMERGING TRENDS IN INTEGRATION



## COMMERCIAL VERSUS FEDERAL SYSTEMS INTEGRATION CHARACTERISTICS

CHARACTERISTIC	COMMERCIAL	FEDERAL
<u>Customers</u>		
Requirements Knowledge	Low	High
Technical Knowledge	Variable	High
Interface	Multiple	Single
<u>Vendors</u>		
Vertical Expertise	Preferred	Mandatory
Customer Base	Leverageable	Reference
Conceptual Strength	Required	Optional
Reputation	Media-Based	Historic
<u>Business Conditions</u>		
Competitive Bids	Optional	Required
Bid Complexity	Variable	High
Expenditure Commitment	Deferrable	"Guaranteed"
Risk Exposure	High	Contained
Contract Type	Fixed-Price	Combination
Price Restrictions	Competitive	Ceilings
Bonuses	Unlikely	Award/Incentive
Penalties	Unlikely	Exception

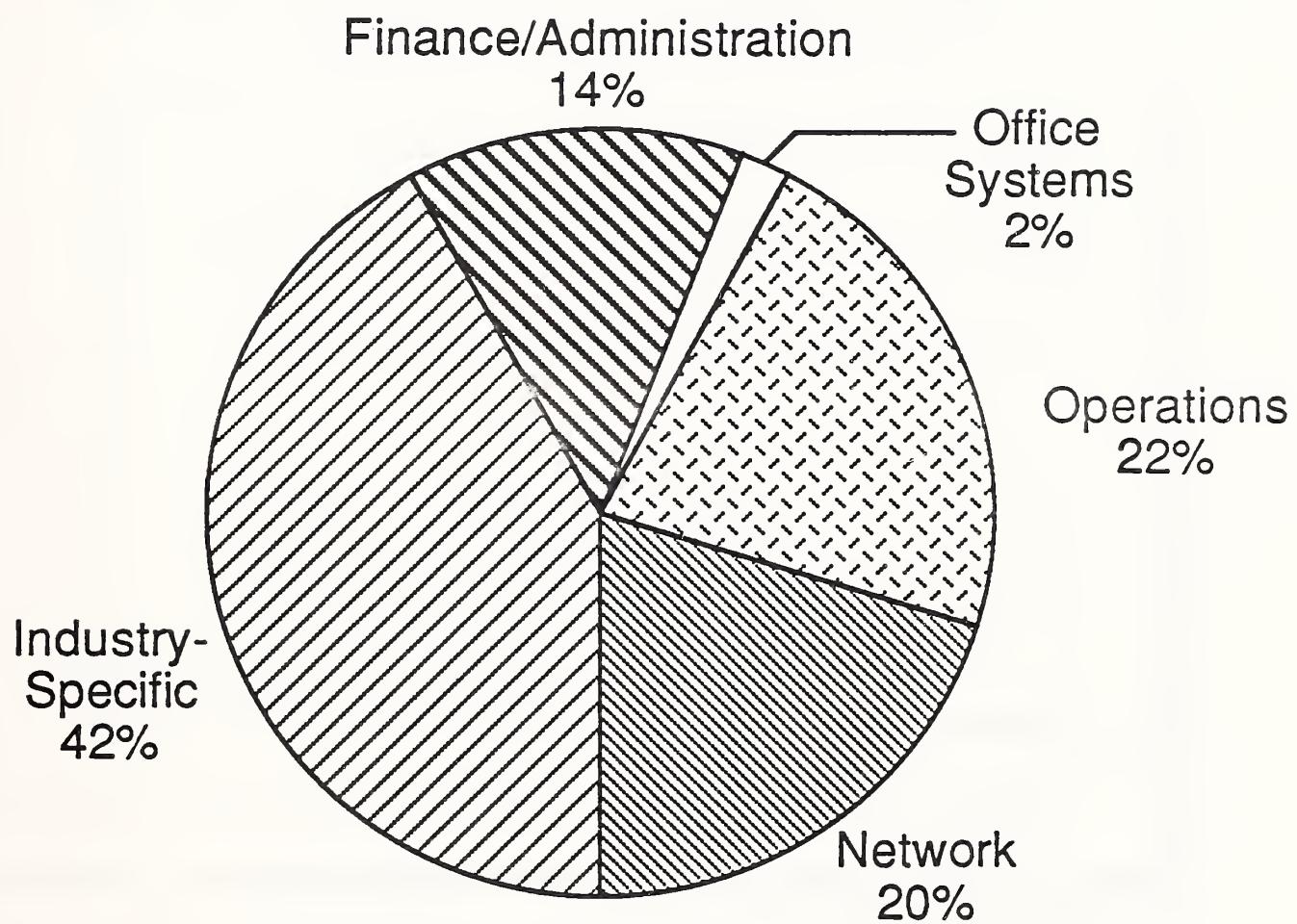
## USER CSI OBJECTIVES

- Integrate Multivendor IS
- Disseminate Management of Technology
- Develop Flexible Systems
- Establish Connectivity

## CSI MARKET DRIVERS

- Meet Business Objectives Rapidly
- Reduce Risk of Systems Development
- "Acquire" Project Management Skills
- Integrate Fragmented Systems
- Save Costs over Internally Developed Solutions
- Use New Technology to Achieve Optimum Solution

## COMMERCIAL SI APPLICATIONS



N = 64

## IMPEDIMENTS TO GROWTH OF CSI

- Large Users Implement CSI In-House
  - Acquire Technical Expertise
  - Gain Project and Risk Management Skills
  - Understand Project Requirements
- DP/IS Loss of Control
- DP/IS "Opportunity Cost" of Experience
- Can 2nd & 3rd Tier Companies Afford CSI?
- Negative Effects of Poor Quality or Untimely Implementation

## **VENDOR MOTIVES IN CSI**

- Create a New Market
- New Distribution Channel for "Core Services"
- Additional Revenue and Earnings
- Account Control
- Create a Backlog
- Margin Enhancement
- Follow-on Sales

## FACTORS FOR SUCCESS IN CSI

FACTOR	RELATIVE IMPORTANCE		
	HIGH	MEDIUM	LOW
Project Management Capabilities	X		
Risk Management	X		
Technical Skills	X		
Familiarity with Leading-Edge Technology		X	
International Capabilities			X
Strategic Alliances, Esp. Software	X		
Experienced Sales Force		X	

## WHY TURNKEY VENDORS CANNOT DO CSI

- Not a Custom Solution (More Product than Customer Oriented)
- Limited Communications Experience
- No Large Project Management Experience
- Narrow Technical Skills
- Only that Vendor's Application Software is an Option

## CSI SOLVES VENDOR PROBLEMS

THE PROBLEM	THE SOLUTION
Incomplete, Unintegrated Products	Multi-Vendor Products Under Integrator Umbrella
Packaged Products that Don't Fit	Services that Build to Specifications
Increased Competition	SI Distribution Funnel

## OTHER VENDOR BENEFITS

- Growth
  - Large Contracts
  - Opportunity for Add-On Business
- High Margins
  - Risk Assumption Premiums
  - Value Added of Integrating

## **VENDOR SKILL REQUIREMENTS**

- Strategic Planners
- Technical Architecture Planners
- Systems Engineers
- Project Managers
- Proposal Developers
- Contract Administrators
- Supplier Managers
- Education/Training Specialists
- Documentation Experts

## CSI PROJECT STAFFING

- Consistent Average of 2 to 3 People per \$1 Million Contract Value
- Higher Ratio for Smaller Projects
- Lower Ratio for Larger Projects
- Vendors Haven't Learned to Leverage People

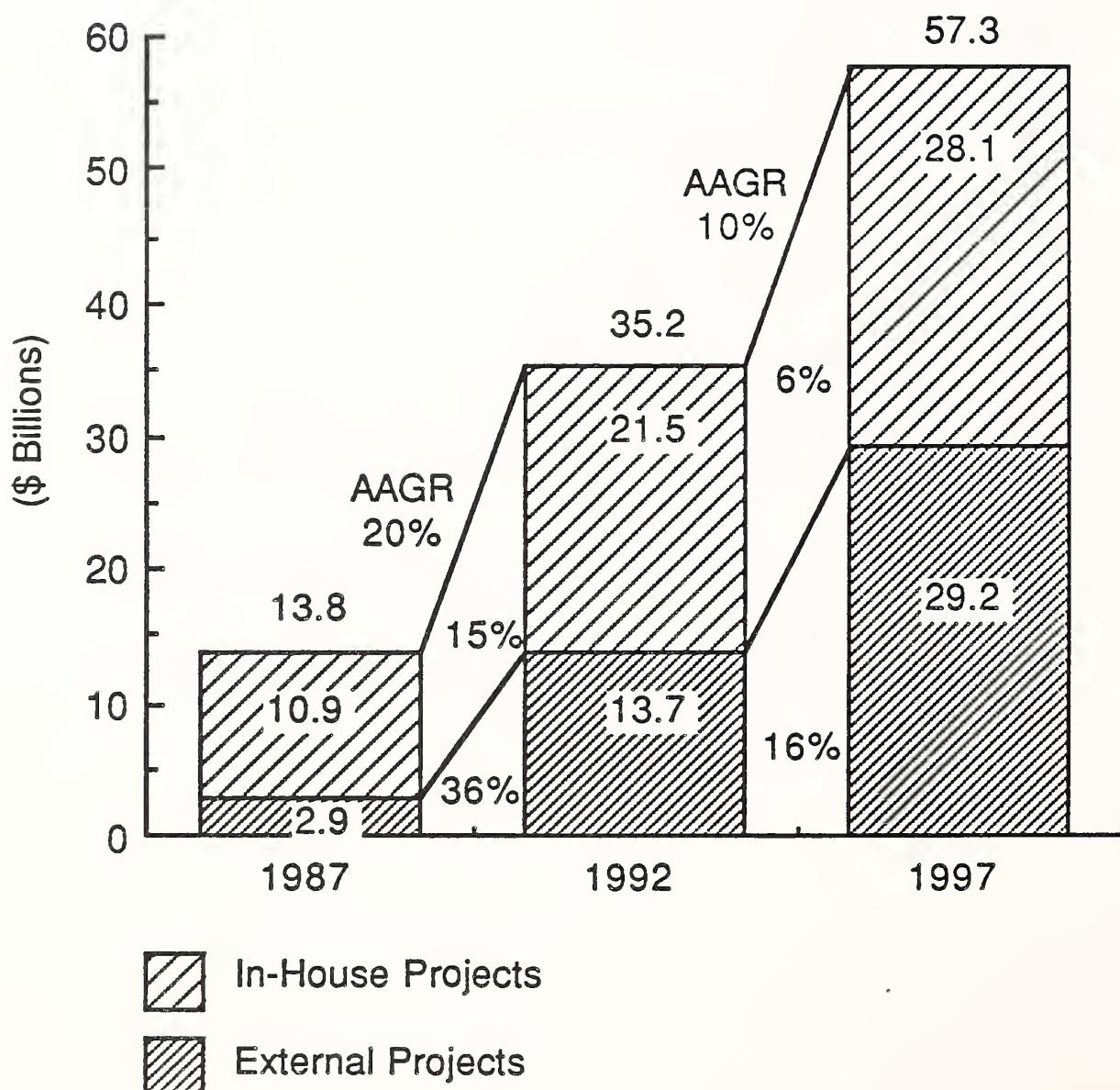
## INTRODUCTION TO CSI MARKET DATA

- Methodology
  - U.S. Department of Commerce Micro-Economic Forecast Plus
  - U.S. Department of Commerce Industry Forecasts
  - Led to
  - INPUT Forecast Expenditures by Project Components
- INPUT Assumptions
  - Data is Shown for External, Not In-House Projects

## INTRODUCTION TO CSI MARKET DATA

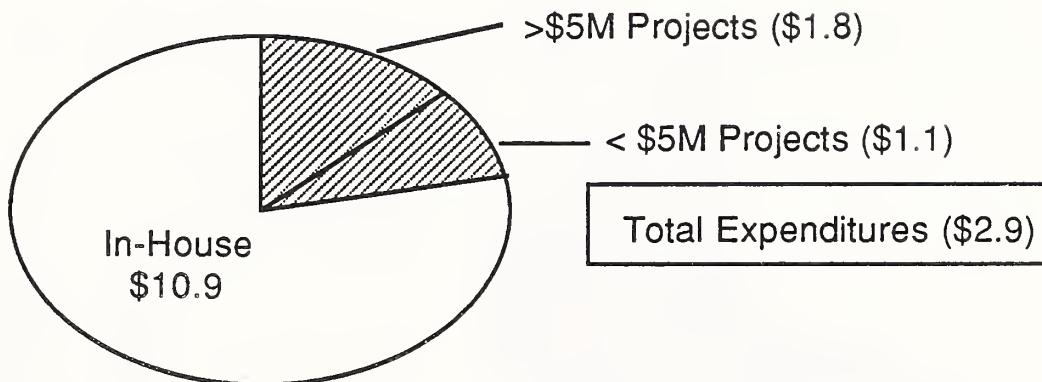
- CSI Project Expenditure Categories
  - In-House
  - Outside > \$5M Projects
  - < \$5M Projects
- CSI Category Expenditures divided into
  - Professional Services
  - Hardware
  - Software Products
  - Other
- CSI Expenditures by 11 Project Component Categories

## VALUE OF CSI PROJECTS, 1987-1997

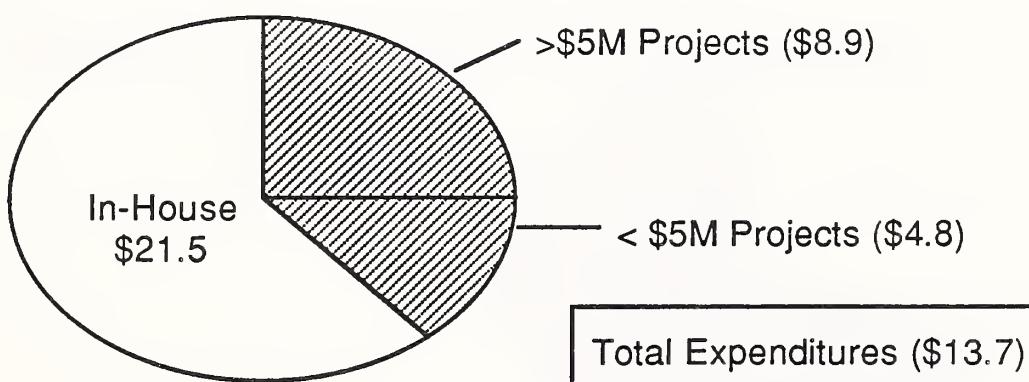


## CSI EXPENDITURES 1987-1997

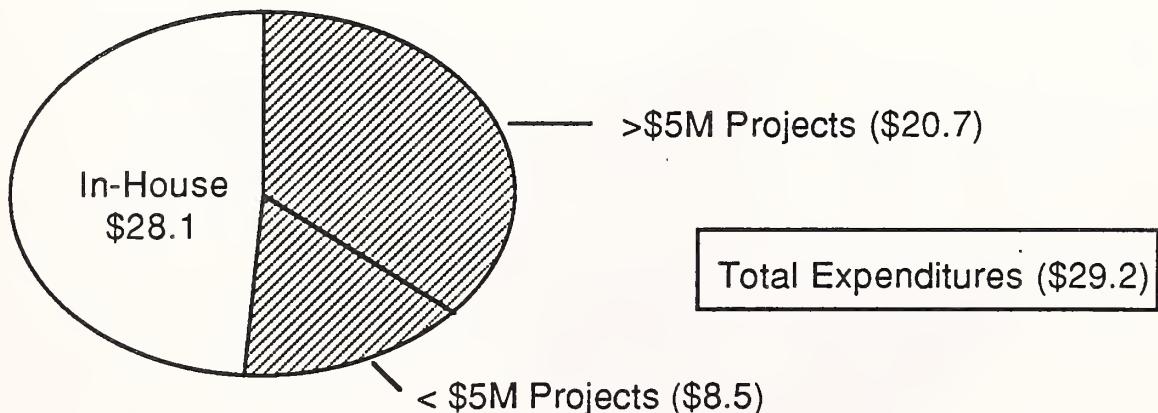
1987 VALUE = \$13.8 BILLION



1992 VALUE = \$35.2 BILLION



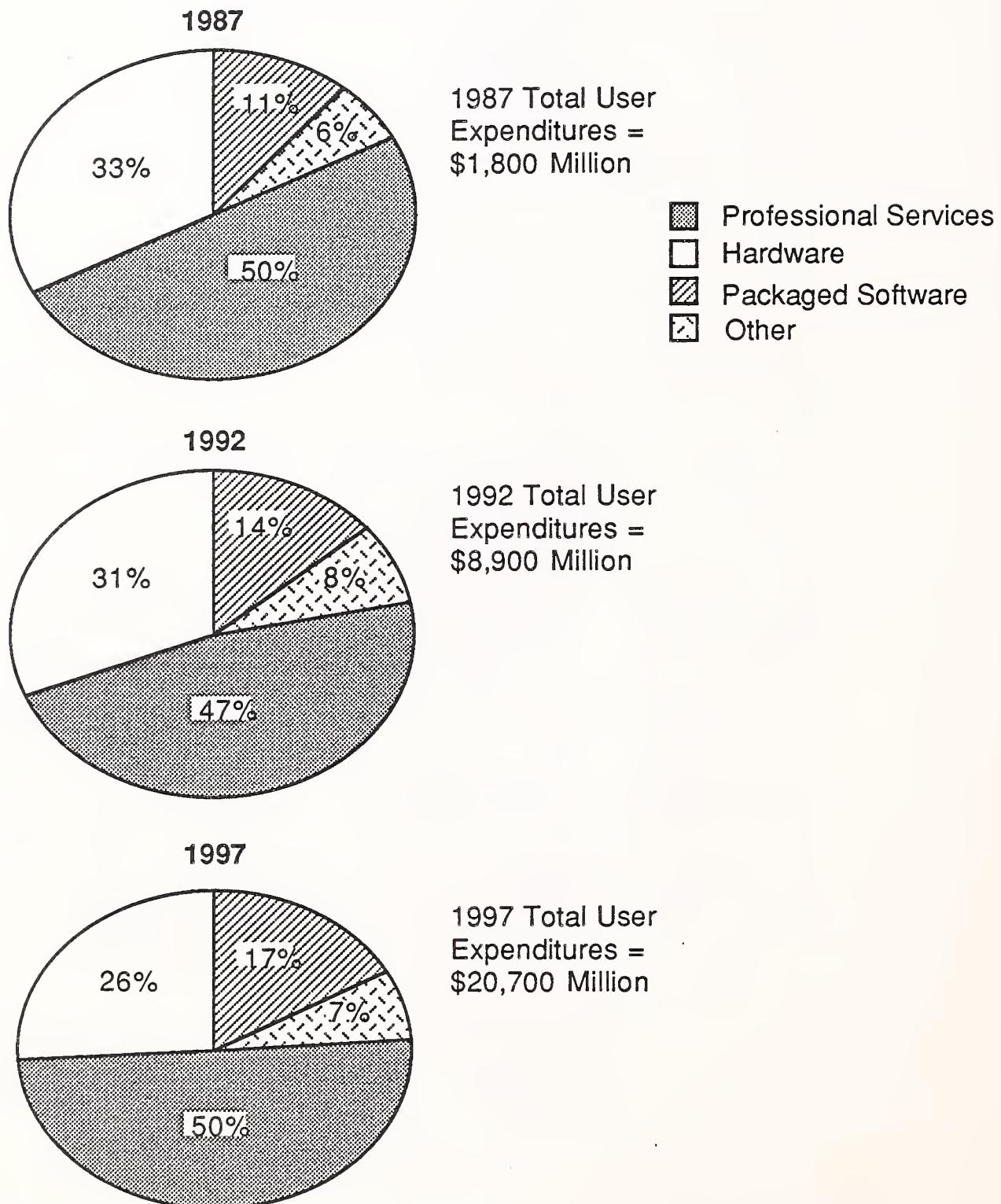
1997 VALUE = \$57.3 BILLION



 TOTAL CSI  
Contracts

## CSI EXPENDITURES BY PROJECT COMPONENT GROUPS 1987-1997

(Projects Greater Than \$5 Million)



## **ASSESSMENT: PROJECTS LESS THAN \$5 MILLION**

- Fewer "Mission Critical" Applications
- Slower Growth
- Small, Undercapitalized Vendors
- Strong In-House Alternative

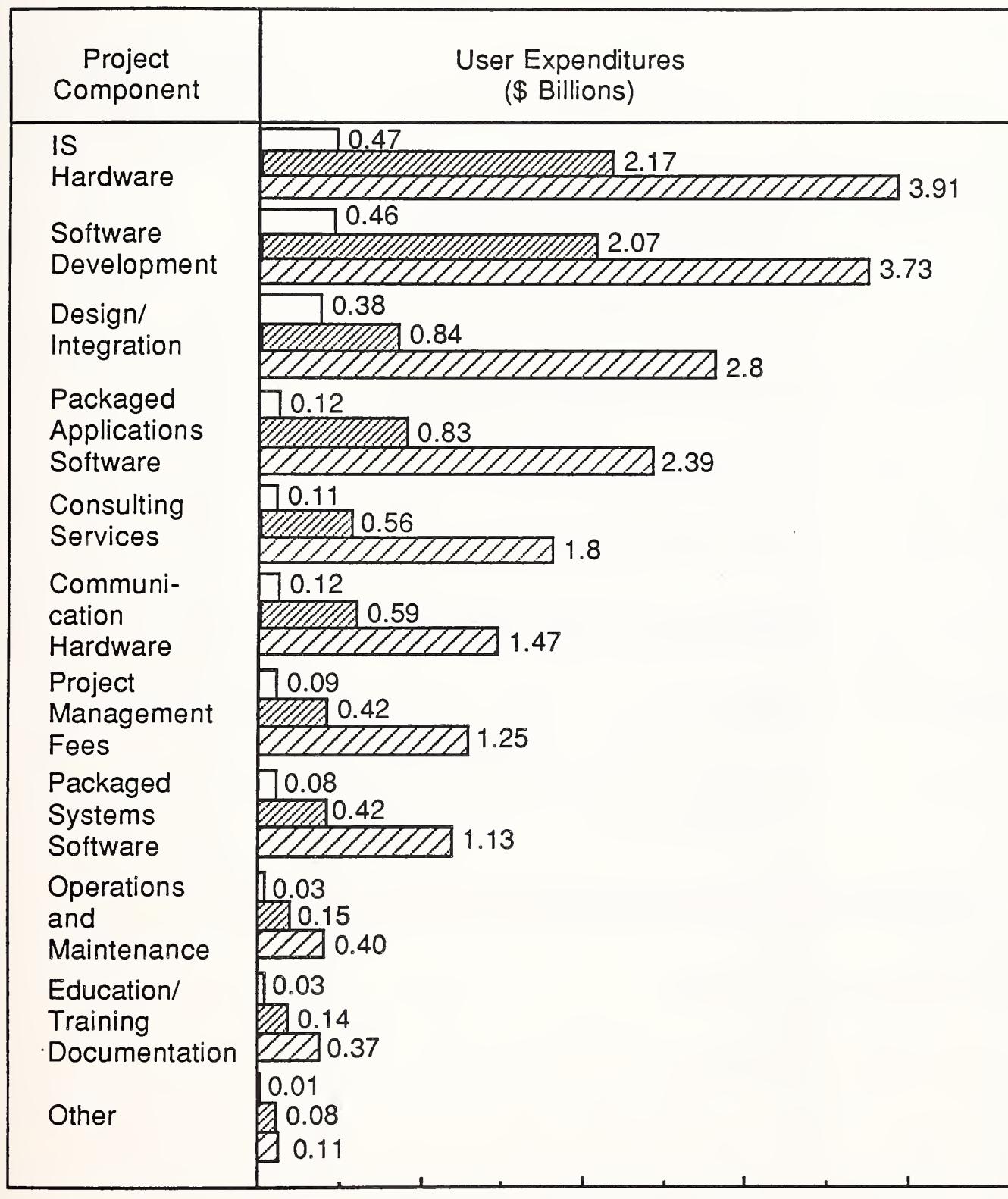
## OVERVIEW OF INDUSTRY SECTOR CSI CHARACTERISTICS

SECTOR	Regulatory	Market Competition	Sophistication	Funding	Profits Volume	Competitor Density	COMMENTS
Discrete/Process Manufacturing	L	H	M	M	M	L	CIM market incipient; no market leader. Multiplicity of islands of automation.
State & Local Government	L	L	M	H	L	M	Steady implementors of automation projects.
Banking/Finance	H	H	M	H	M	H	In period of transition; "running scared."
Distribution	L	H	L	L	H	L	High volume, low margins; control and cost cutting.
Insurance	M	M	M	H	L	L	Coming out of a slump in profits into period of plenty.
Medical	H	H	M	H	M	M	Coming out of period of plenty into cost-cutting mode.
Services	L	M	M	M	H	L	Diverse, scattered market.
Telecommunications	H	H	H	H	M	M	Heavy competition, very aggressive, diversification oriented.
Transportation	M	M	L	L	L	L	Heavy competition, union ridden; aggressive but broke.
Utilities	H	L	H	H	L	H	Steady implementors of automation and control projects.

Ratings: L = Low, M = Medium, H = High

# CSI EXPENDITURES, ALL PROJECT COMPONENTS

1987, 1992, 1997



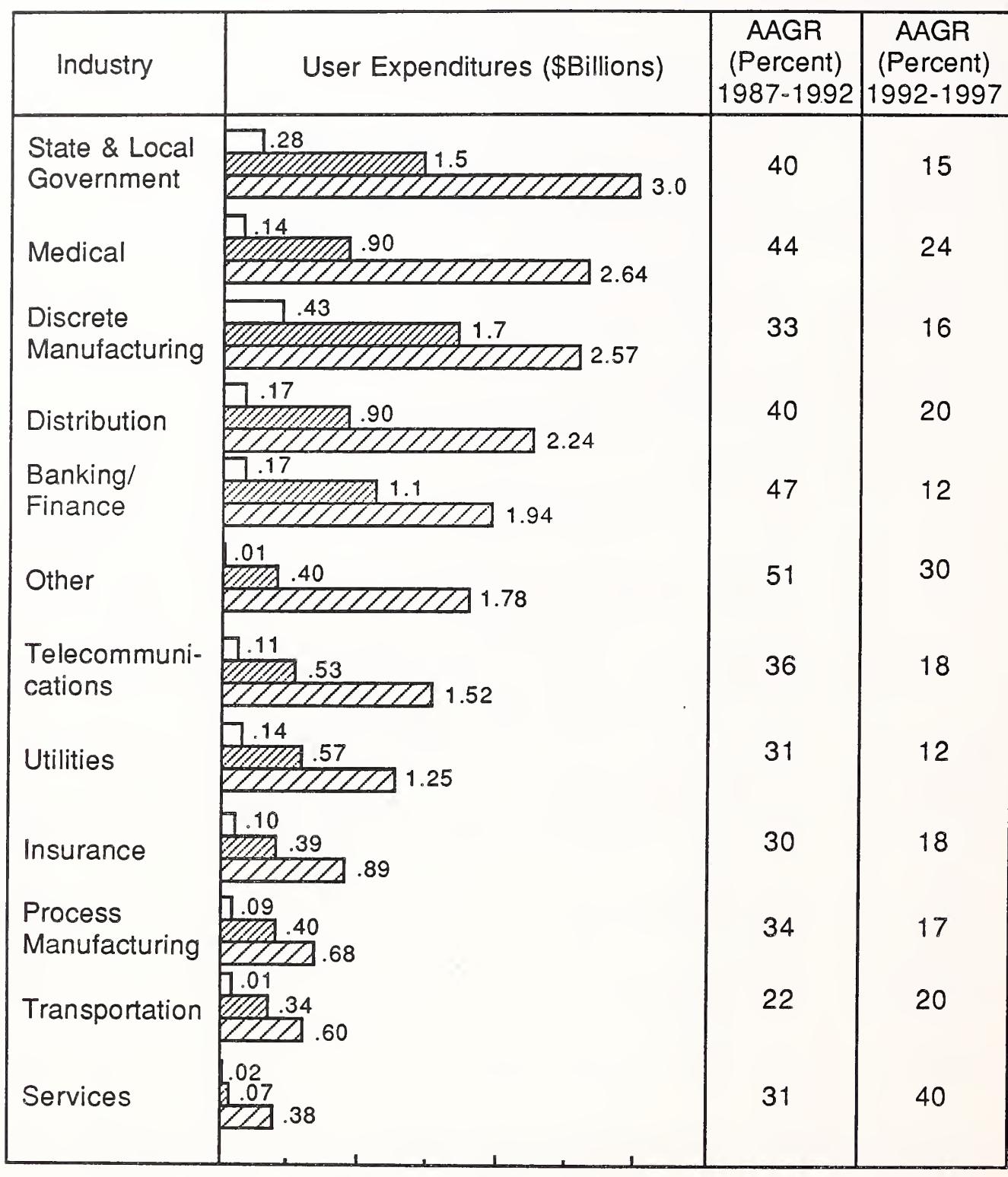
 1987

 1992

 1997

# TOTAL CSI EXPENDITURES BY INDUSTRY, 1987-1997

(Projects Greater Than \$5 Million)



 1987    1992    1997

## **BANKING/FINANCIAL SERVICES INDUSTRY FORCES**

- Deregulation
  - Business Functions
  - Business Practices
- Consolidation or Closure
- Pressure for Profitability
  - Contain Costs
  - Develop New Financial Products/Services
- Technology Role
  - ATM/POS/EFT
  - Electronic Banking Networks
  - ISDN

## **IMPACT ON BANKING/FINANCIAL SERVICES I.S.**

- IS as a Competitive Weapon
- Increased Data/Information Requirements
  - Heavy Networking Requirements
  - Shorter System Life Cycle
  - Integrated Applications
  - Link DP and Central DP Applications
- Result: Increased Need for Data Control and Data Integrity

## KEY FACTORS IMPACTING CSI POTENTIAL IN BANKING/FINANCE

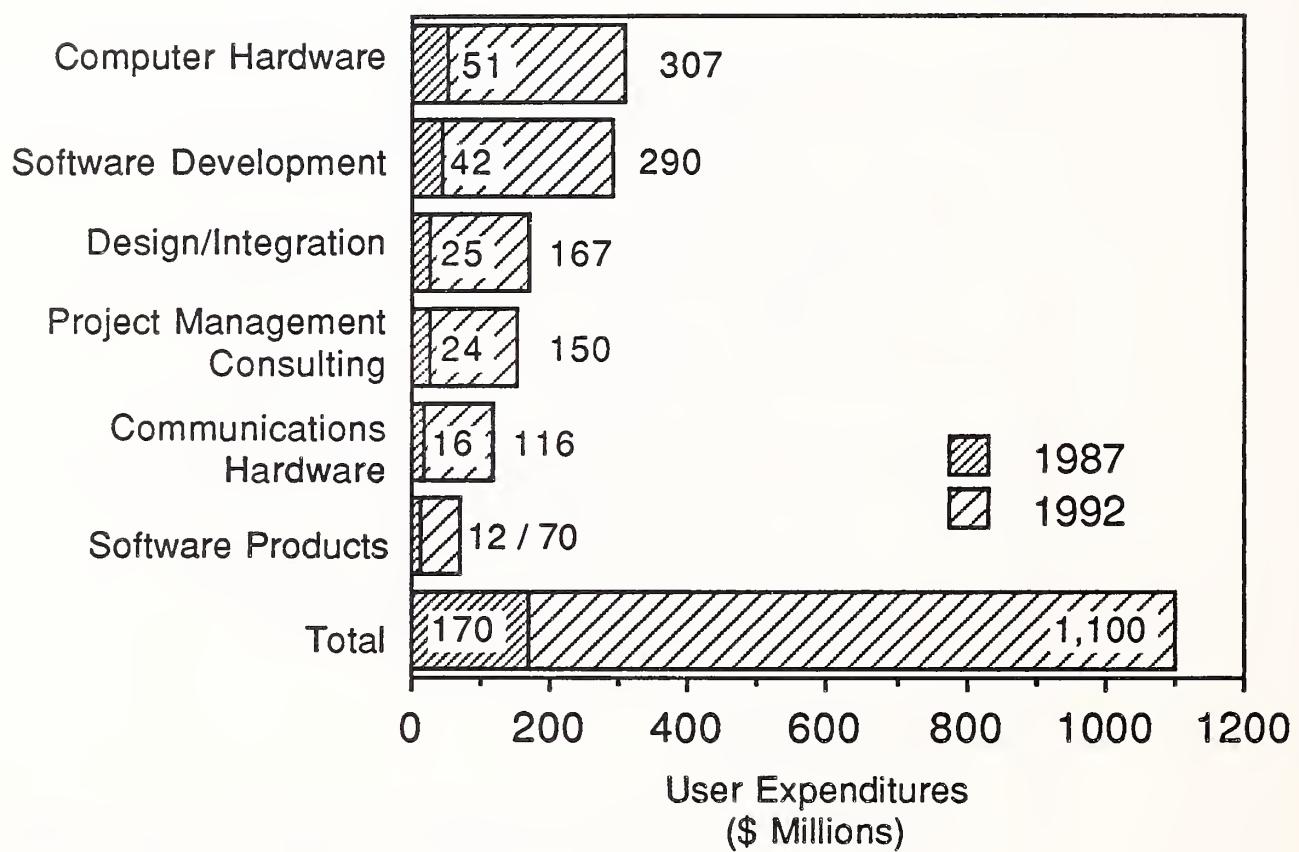
### POSITIVE

- Very Strong Competition Demands
- Time-Sensitive Information Requirements
- Growing Body of End Users
- Technical Innovation Desired

### NEGATIVE

- Structural Changes Underway, but Incomplete
- "Parochial" View of In-House Capabilities
- Many "Product" Alternatives
- Opportunities Hard to Locate
- Industry and Application Experience Required

## BANKING/FINANCE CSI FORECAST 1987-1992



1997 Estimate = \$1,940 Million

## DISTRIBUTION INDUSTRY FORCES

- Shrinking Profit Margins
- Increasing Competition
- Solution: Add Electronic-Based Services
  - EFT
  - Check Verification
  - POS Networks

## **IMPACT ON DISTRIBUTION INDUSTRY I.S.**

- Systems Developed to Reduce Costs:
  - Logistics
  - Cash Management
  - Funds Consolidation and Transfer
- Systems Developed to Improve Service:
  - Order Entry
  - EDI
  - Sales/Marketing Information
- Result: Increased Emphasis on Communications/CSI

## **KEY FACTORS IMPACTING CSI POTENTIAL IN DISTRIBUTION**

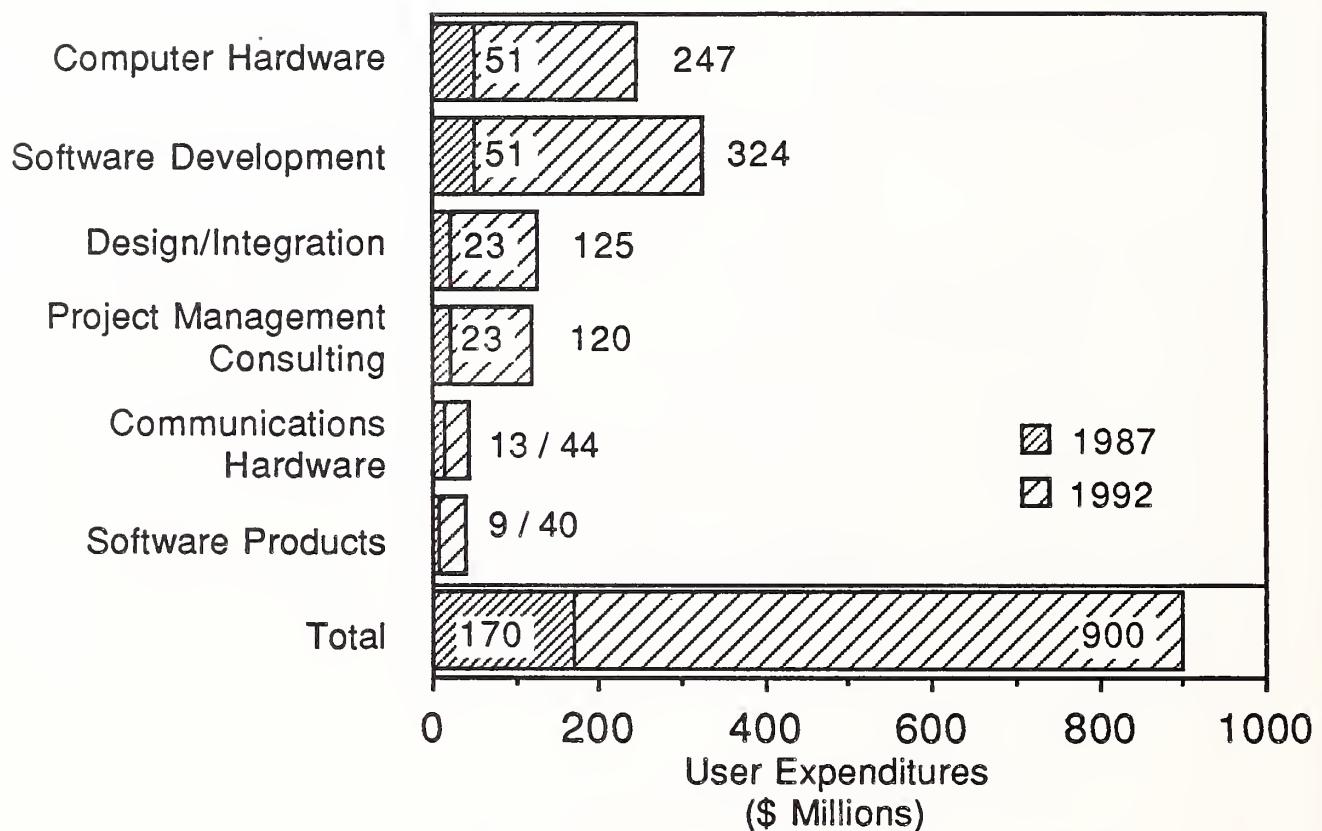
### **POSITIVE**

- Network Requirements
- Increasing Use of POS and Optical Technology
- Strong Interest in Customer Service
- Network Design and Project Management Skills Missing

### **NEGATIVE**

- Infrequent User of Outside Services
- Smaller-than-Average Project Expenditures

## DISTRIBUTION CSI FORECAST 1987-1992



1997 Estimate = \$2,240 Million

## **INSURANCE INDUSTRY FORCES**

- Increased Competition by Other Financial Institutions
- Industry Consolidations
- Rebuild Profits Following 1984-85 Losses
  - Restructure Sales Networks
  - Offer New Insurance Products
  - Diversify into Financial Areas

## **IMPACT ON INSURANCE INDUSTRY I.S.**

- Reduce Costs by Improving Efficiency
  - Careful IS Planning
  - Improved Output per Number
- Implement More-Advanced Systems
- Increased Needs for Networking

## KEY FACTORS IMPACTING CSI POTENTIAL IN INSURANCE

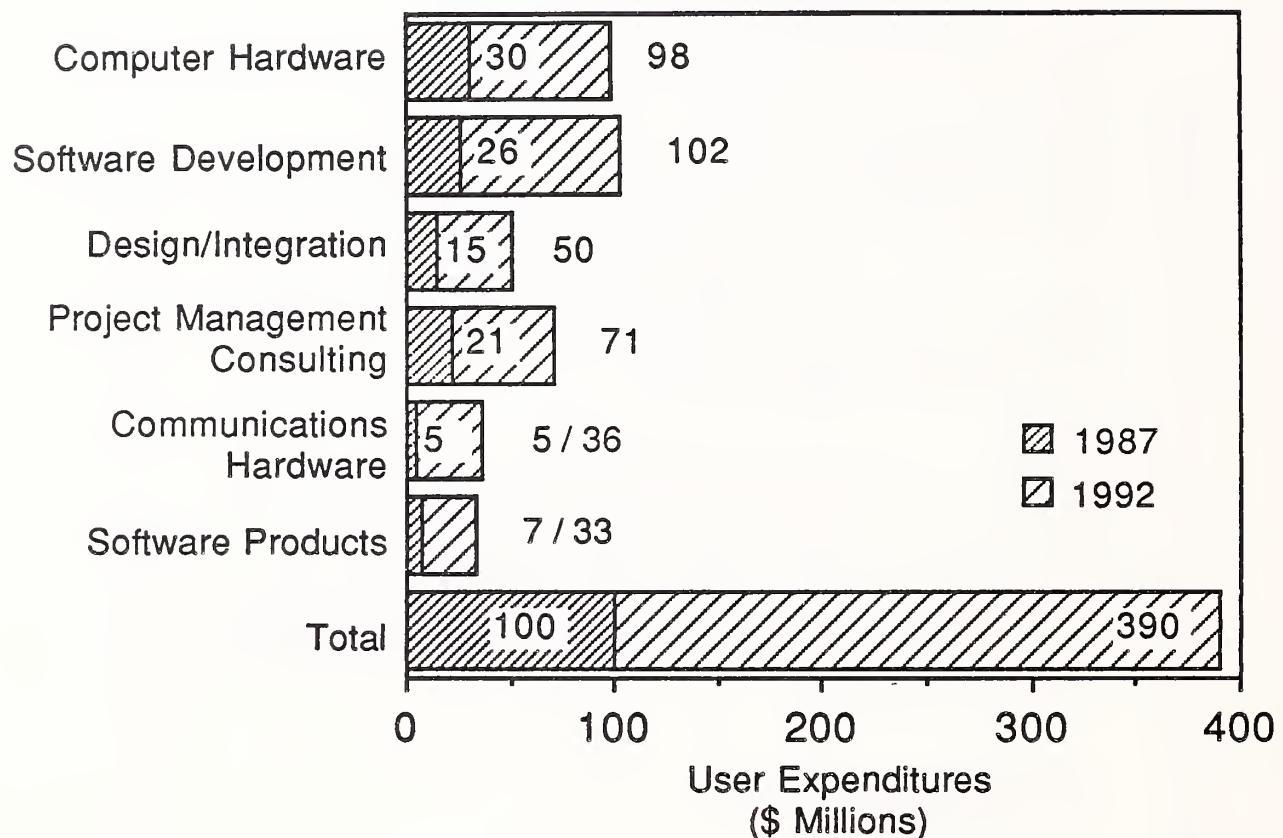
### POSITIVE

- Shrinking In-House IS Staff
- New Products (Insurance and Financial) Require Support
- Need for Policyholder/Client Information
- Integrated Network Requirements
- Lack of In-House Skills in Sophisticated Technologies

### NEGATIVE

- Cost Control Measures Limit New Starts
- Ongoing Industry Restructuring
- Industry-Specific Knowledge/Experience
- Self-Sufficiency Mentality

## INSURANCE CSI FORECAST 1987-1992



1997 Estimate = \$890 Million

## DISCRETE MANUFACTURING INDUSTRY FORCES

- Foreign Competition
- Response: Increased Automation
  - JIT/Flexible Manufacturing Systems
  - CIM
- Needs:
  - Revise Entire Manufacturing Process
  - Increased Emphasis on Customer Service

## **IMPACT ON DISCRETE MANUFACTURING I.S.**

- Stable D.P. Environment in Discrete Manufacturing
- Large Base of Installed Hardware and Software Due to:
  - Decreasing Hardware Costs
  - Better Price/ Performance
  - Growth of Industry Standards
  - Purchase, not Lease, Hardware & Software
- Large Base of Incompatible Automation Equipment
- Need: Integration

## KEY FACTORS IMPACTING CSI POTENTIAL IN DISCRETE MANUFACTURING

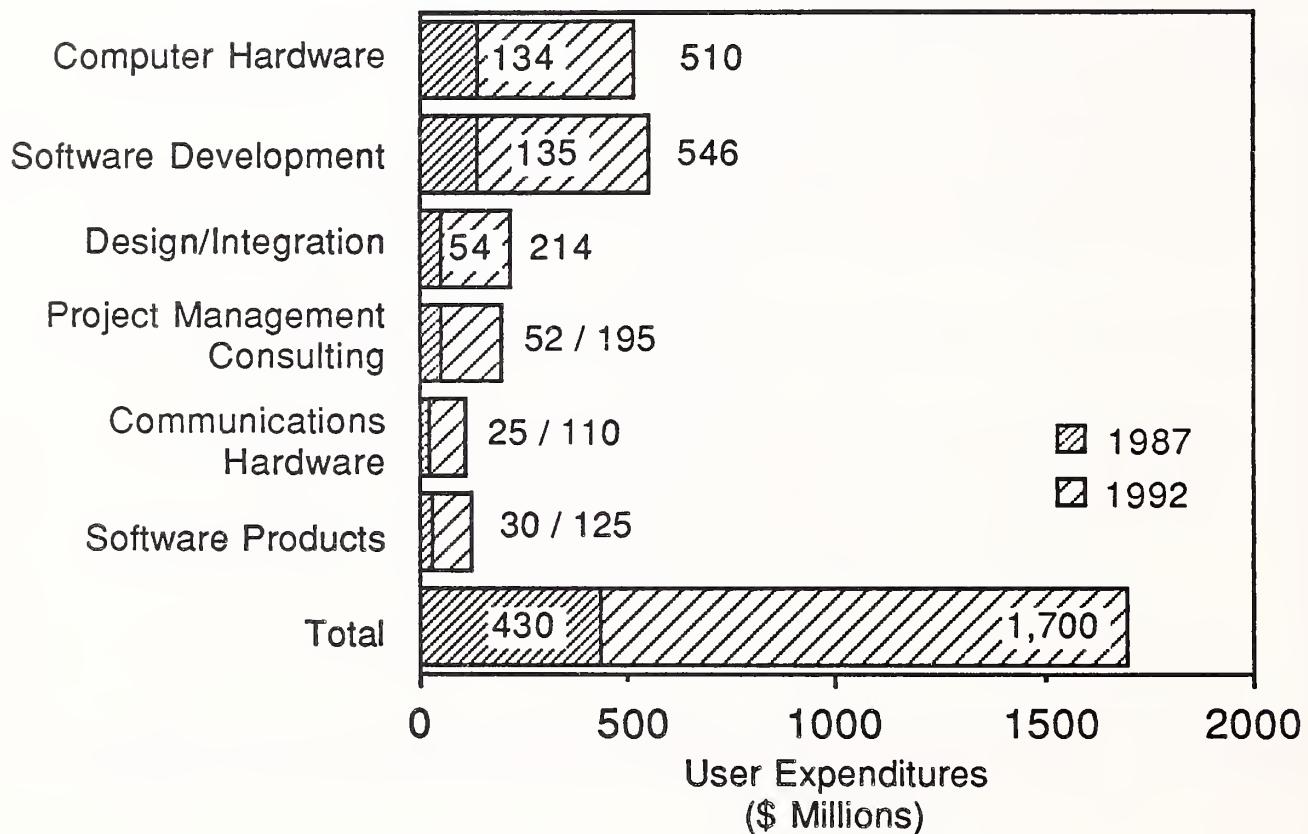
### POSITIVE

- Extensive Competition to Be Countered by New Technology
- Stable DP Environment Reduces Risks of CSI
- Larger Sector, Extensive Project Expenditures
- Communications Network Integration Needs

### NEGATIVE

- IBM Dominates Hardware Component
- Conventional Projects
- Some Negative Experiences with CSI
- Industry and CSI Experience Prerequisite

## DISCRETE MANUFACTURING CSI FORECAST 1987-1992



1997 Estimate = \$2,570 Million

## PROCESS MANUFACTURING INDUSTRY FORCES

- Falling Raw Material Prices or Reduced Demand
- Increased Competition
- Current Focus:
  - Reduce Costs
  - "Automate or Evaporate"

## IMPACT ON PROCESS MANUFACTURING I.S.

- Increased Demand for Network Integration
- Need for Systems with Heavy Engineering and Instrument Content
  - Process Control
  - Inventory Control
  - Shipping Control
  - Automated Materials Handling
- Burgeoning Interest in EDI

## KEY FACTORS IMPACTING CSI POTENTIAL IN PROCESS MANUFACTURING

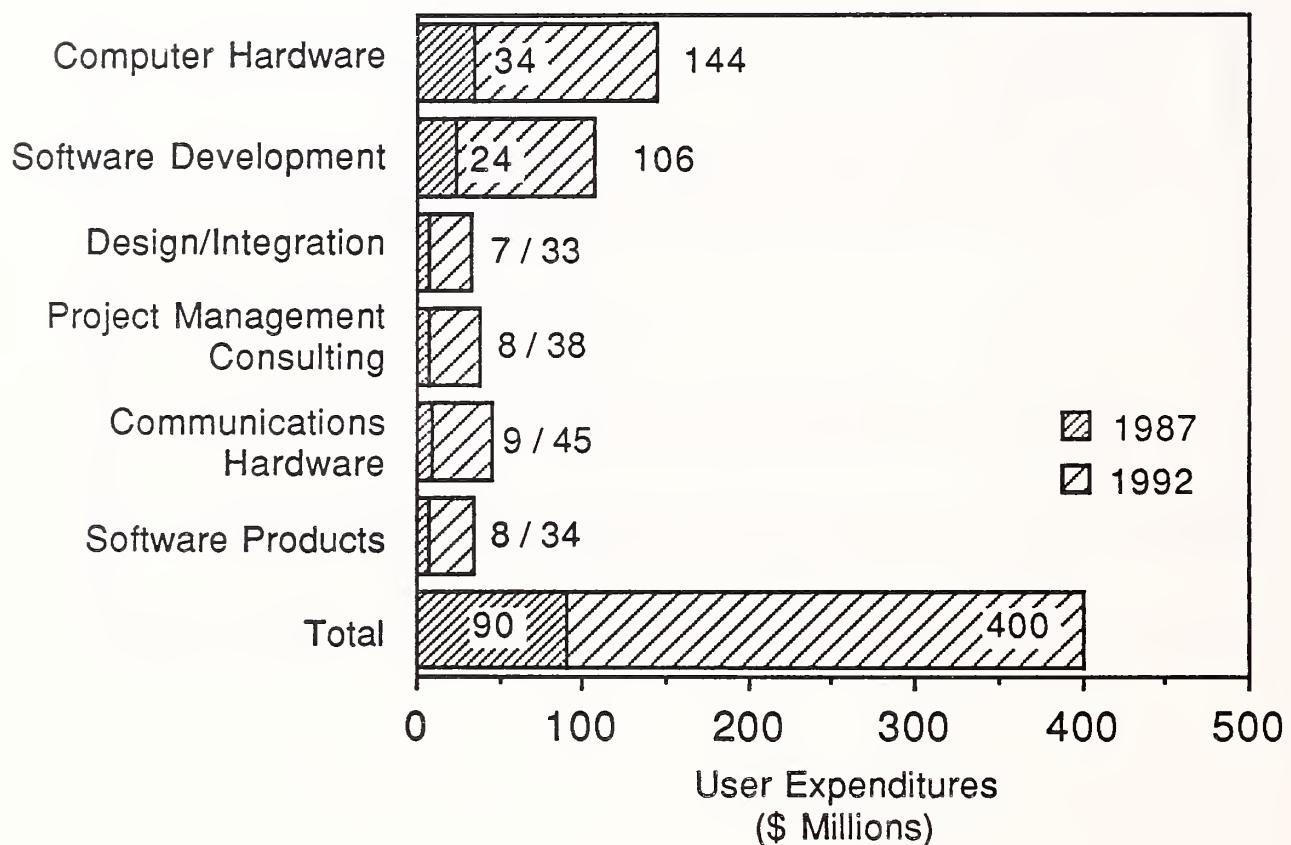
### Positive

- Competitive Need
- Lack of In-House Skills
- Network Design/Integration Requirements

### Negative

- Few Large Establishments
- Reluctance to Contract for Services

## PROCESS MANUFACTURING CSI FORECAST 1987-1992



1997 Estimate = \$680 Million

## MEDICAL INDUSTRY DRIVING FORCES

- Slowing Growth
- New Competition
  - HMOs/PPOs
  - Investor-Owned Hospitals
  - Small Clinics
  - More Group Practices
- Pressure to Reduce Costs
- Shift from Reimbursement-Based to a DRG Basis (Diagnostic-Related Group)

## **IMPACT ON MEDICAL INDUSTRY I.S.**

- Increase in On-Line, Real-Time Processing
- Integration of Financial, Patient Care, Nursing Management, and Laboratory Systems
- More Spending to Increase Efficiency of Operational Support Areas (Medical Records, Patient Medical History, etc.)

## KEY FACTORS IMPACTING CSI POTENTIAL IN MEDICAL INDUSTRY

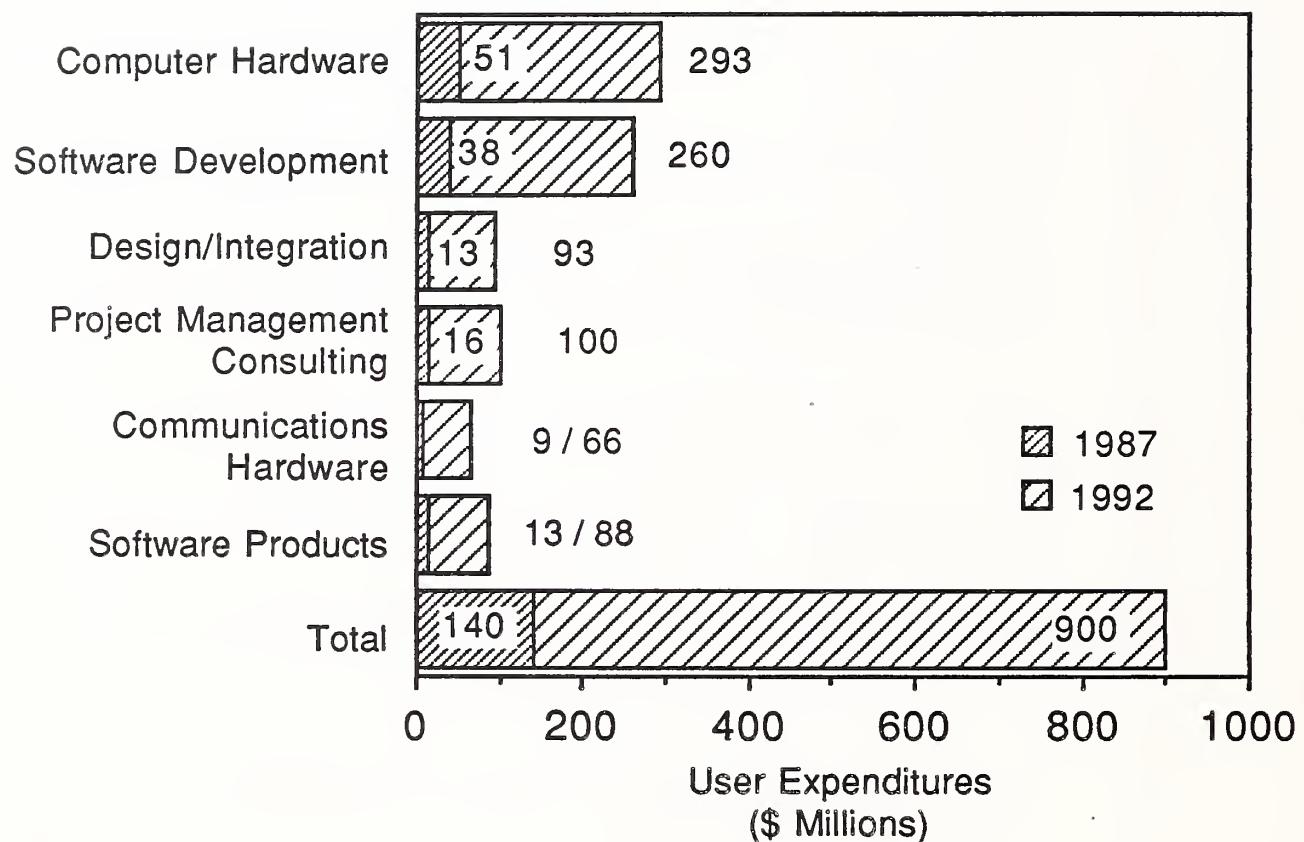
### POSITIVE

- Pressure to Reduce Medical Services Costs
- Pricing Structure Changing to Cost Basis
- Lack of In-House Skills
- High Use of Outside Contractors

### NEGATIVE

- Turnkey Systems Vendors Very Active
- Industry Experience Required
- Limited Number of Large Companies
- Financial Limitations

## MEDICAL CSI FORECAST 1987-1992



1997 Estimate = \$2,640 Million

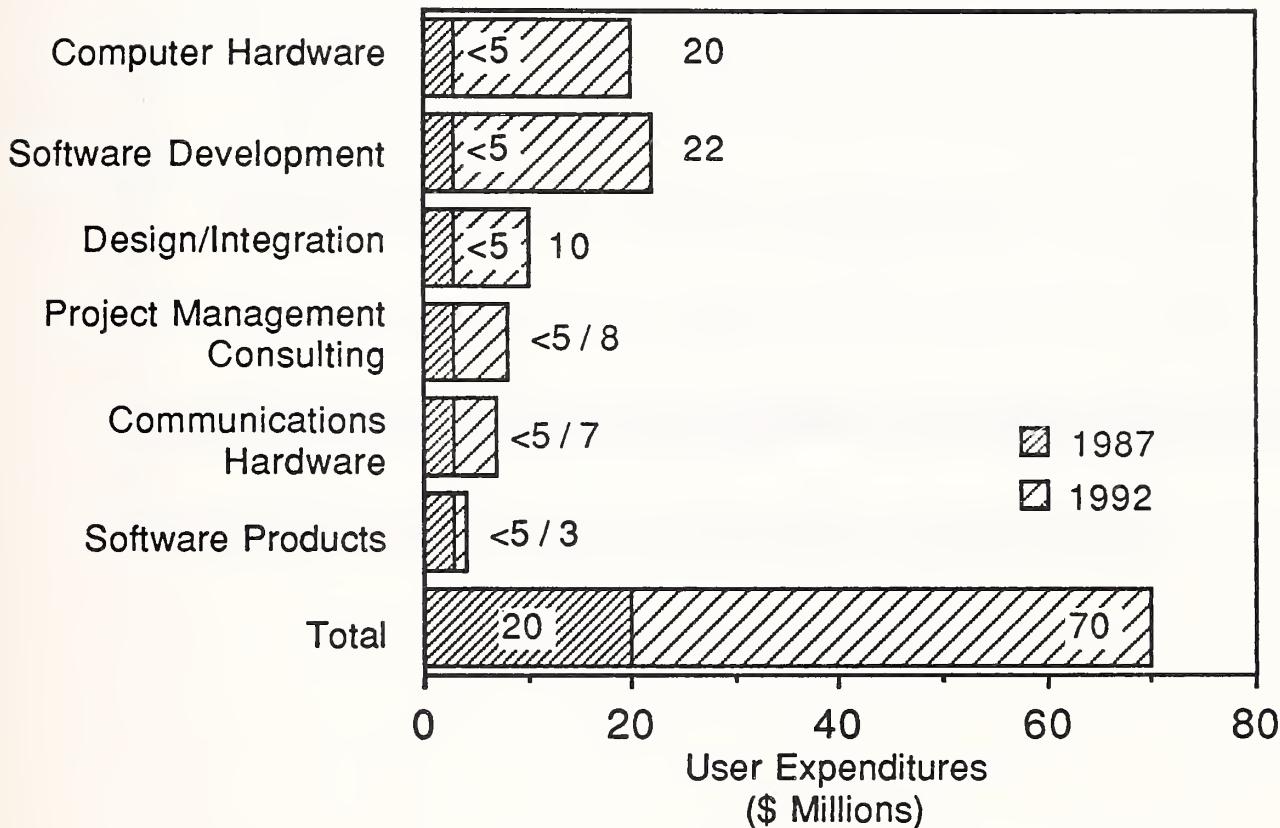
## **SERVICES INDUSTRY DRIVING FORCES**

- Fragmented Market
- Opportunistic Approach for CSI
- Limited Opportunities: Large Firms in Accounting, Legal, Engineering, Architecture, and Consulting
- Needs: Information Management Capabilities

## IMPACT ON SERVICES INDUSTRY I.S.

- Largest Firms Would Use CSI Services
- Targets: Legal, Engineering, Architecture, and Consulting
- Exception: Accounting (In-House Capability)

## SERVICES CSI FORECAST 1987-1992



1997 Estimate = \$380 Million

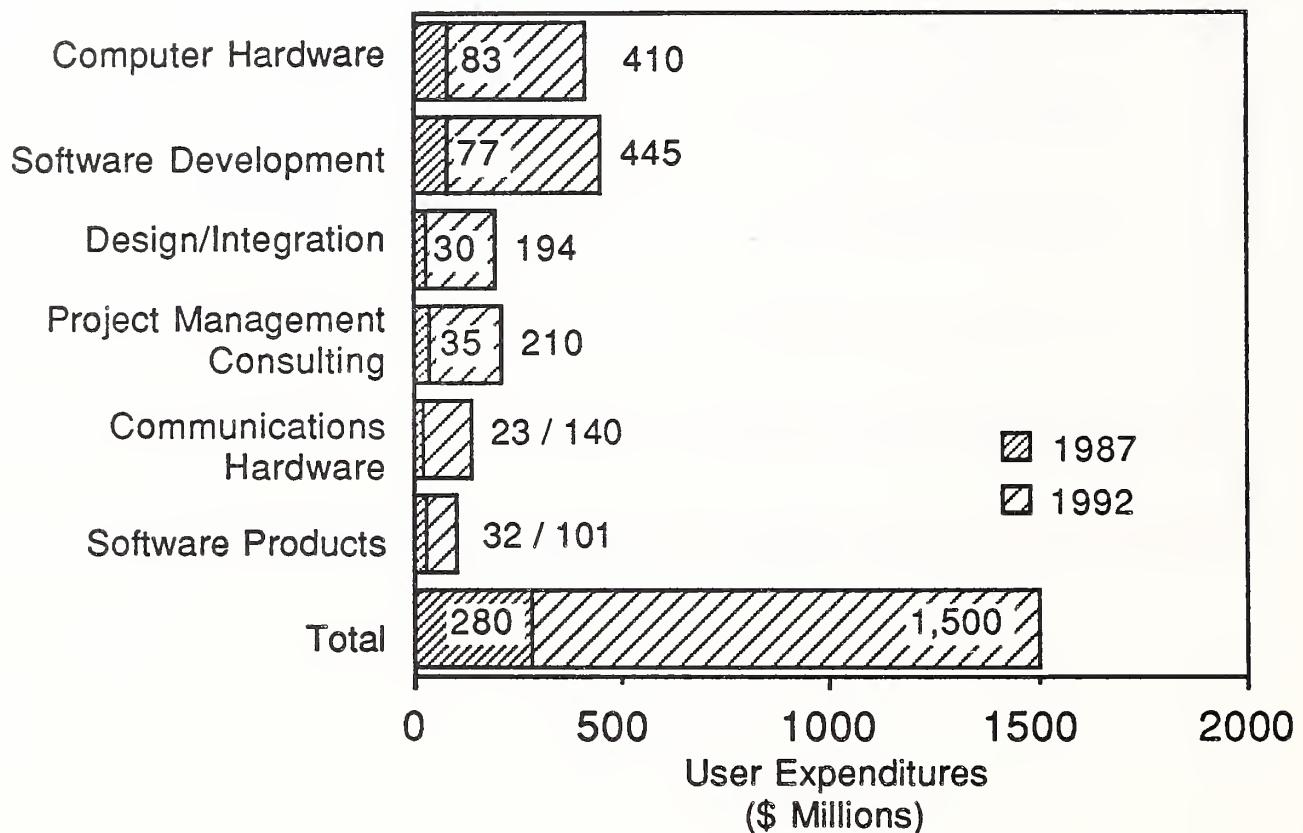
## **STATE AND LOCAL GOVERNMENT DRIVING FORCES**

- Increased Demand for Services
- Lack of Corresponding Increase in Tax Revenues
- Need: Increased Efficiency

## **IMPACT ON STATE/LOCAL GOVERNMENT I.S.**

- Increased Operating Efficiency and More Timely Information
- Improve Revenue Collection Systems
- Problem: Staff Retention
- Opportunity: CSI Services

## STATE AND LOCAL GOVERNMENT CSI FORECAST 1987-1992



1997 Estimate = \$3,000 Million

## TELECOMMUNICATIONS INDUSTRY DRIVING FORCES

- Deregulation
- Increased Competition
- Increased Importance of Connectivity

## IMPACT ON TELECOMMUNICATIONS INDUSTRY I.S.

- Degree of Computer/Communication Integration Required
- Needs for Planning and Management Tools
- Loss of Support from AT&T Means Opportunity

## **KEY FACTORS IMPACTING CSI POTENTIAL IN TELECOMMUNICATIONS**

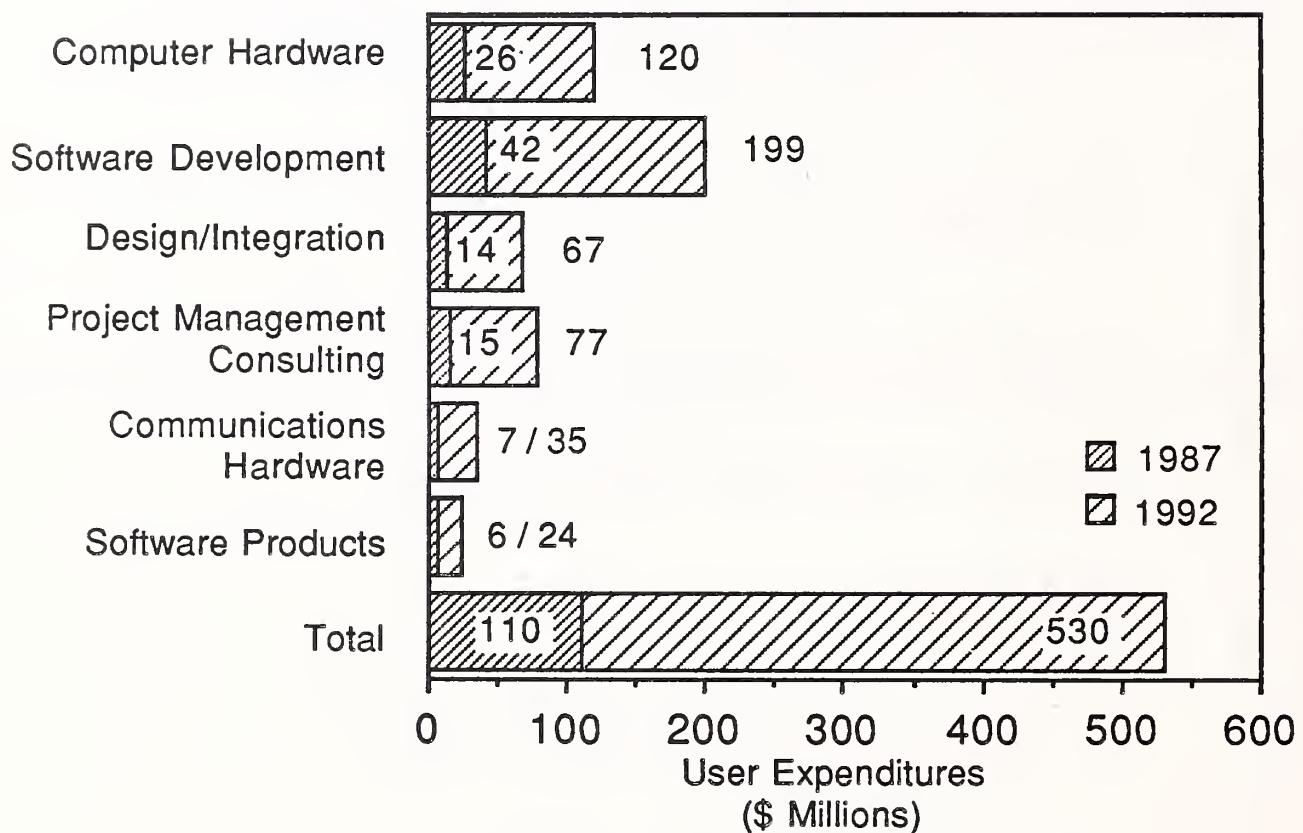
### **POSITIVE**

- Merger of Computers and Communications
- Internal Lack of Project Discipline
- Network Integration Opportunities

### **NEGATIVE**

- Industry Restructuring Delay Projects
- Perceived In-House Technical Skills
- Highly Unionized Work Force

## TELECOMMUNICATIONS CSI FORECAST 1987-1992



1997 Estimate = \$1,520 Million

## TRANSPORTATION INDUSTRY DRIVING FORCES

- Cost Containment
- Increased Productivity
- Better Customer Service
- Increased Competition
- Mergers and Acquisitions

## IMPACT ON TRANSPORTATION INDUSTRY I.S.

- Use of Communications-Intensive Systems
  - Reservations
  - Crew Scheduling
  - Route Optimizing Modeling
- Better-Quality and More-Timely Information

## KEY FACTORS IMPACTING CSI POTENTIAL IN TRANSPORTATION

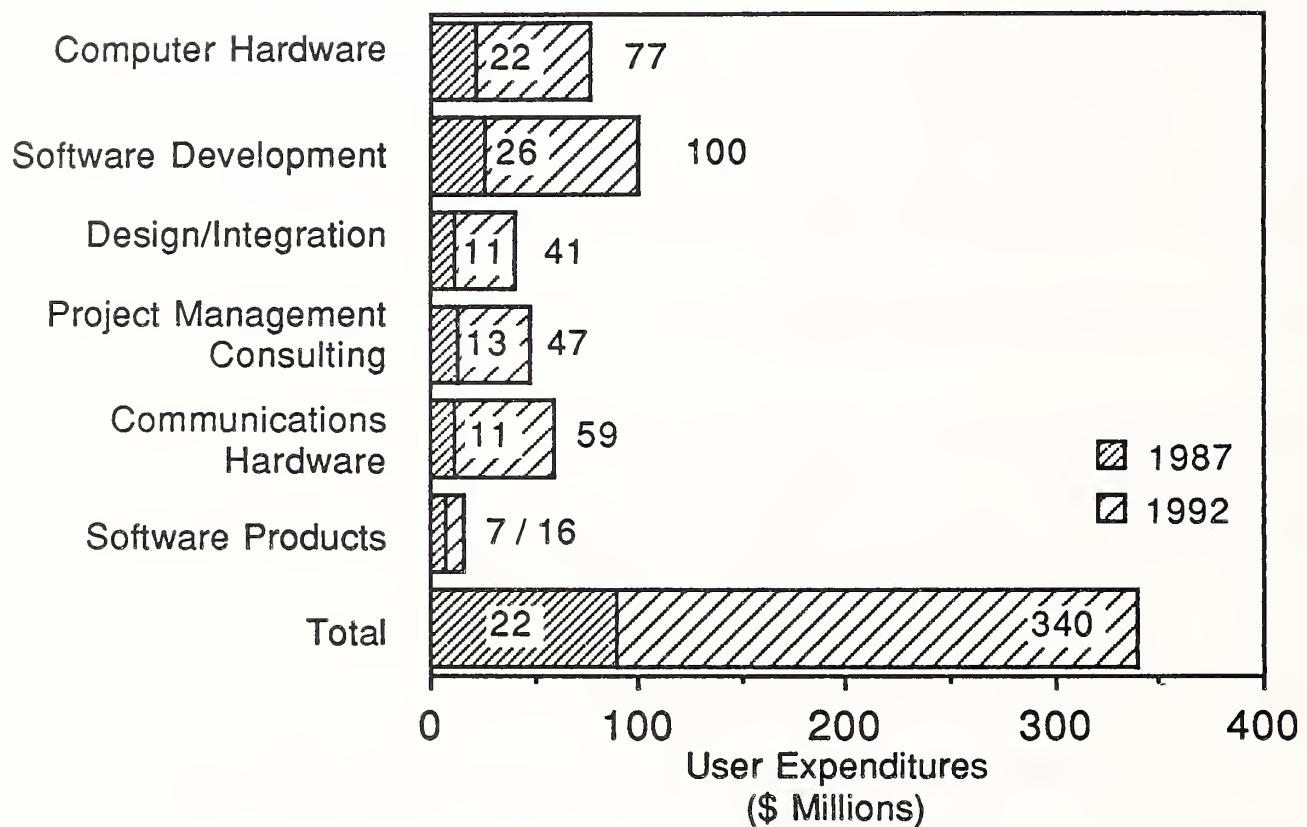
### POSITIVE

- Competition and Changing Rates Require Support
- Strong Need for End-to-End Systems
- Network Design/Integration Requirements
- In-House Skill Limitations

### NEGATIVE

- Few Opportunities Outside of Airline Segment
- Little Growth in IS Expenditures
- Limited Use of Outside Services

## TRANSPORTATION CSI FORECAST 1987-1992



1997 Estimate = \$600 Million

## **UTILITIES INDUSTRY DRIVING FORCES**

- Move from Regulated Monopolies to Multiservice Providers
- Balance Supplies and Consumer Demands, with Need for New Facilities
- Relieve Pressures on Balance Sheet Resulting from Cost Overruns on Nuclear Power Plant Construction

## KEY FACTORS IMPACTING CSI POTENTIAL IN UTILITIES

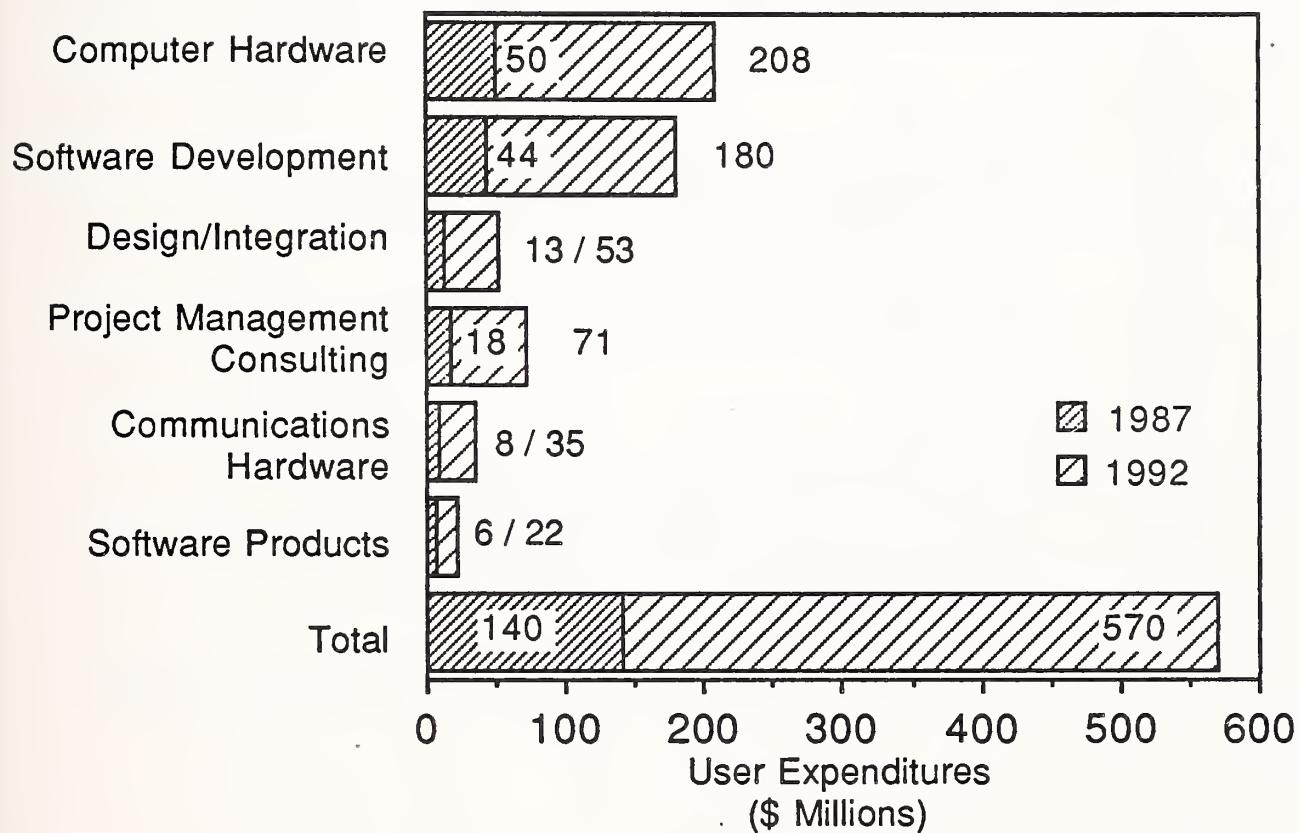
### POSITIVE

- Increasing Interest in Use of Technology for Competition Advantage
- Interest in Corporate Data Base Interaction
- Need to Support End Users
- Opportunity for Financial Applications

### NEGATIVE

- Day-to-Day Orientation of IS
- Limited Number of Establishments
- Financial Constraints
- Modular, Rather than Total, View of System

## UTILITIES CSI FORECAST 1987-1992



1997 Estimate = \$1,250 Million

## OPPORTUNITIES IN "OTHER" INDUSTRIES

- Agriculture
  - Communication Networks
  - Integrated Inventory Management Distribution Management Systems
  - Targets: Large Agribusiness Firms
- Education
  - Statewide or Campuswide Data Networks
  - Targets: Large, Geographically Dispersed Universities

## CUSTOMER BUYING PROCESS



## INTRODUCTION: CUSTOMER BUYING PROCESS

- Origin of CSI Projects
- CSI Decision Process
- CSI Project Time Line
- User Role in CSI Project Implementation

## USER FORCES DRIVING CSI PURCHASES

- Mission Critical System Requirements (CEO Level)
- More and Better Competition Demands an Organized, Rapid Response
- Integrate the Organization's Infrastructure
- Realize the Benefits of the Investment

## WHERE CSI PROJECTS COME FROM

- Expertise is Limited or Experiences Bad
- Single-Source Solution is Preferred
- Vendor "Partners" are Desired
- Solution is Not Preconceived
- Consultant Recommends It

## USER FACTORS CITED FOR DOING CSI PROJECTS

Factor	Number of Mentions *	% of Mentions
<b><u>Improvements</u></b>		
Quality/Service/Speed/ # of Transactions/Productivity	6	
Replace Outdated System	1	
From Manual to Automated System	3	
Better Reporting	2	
Subtotal	12	37%
<b><u>Technology Issues</u></b>		
Integrate Separate Components/ Databases	3	
Lack of Connectivity	2	
Subtotal	5	15%
<b><u>Operational Issues</u></b>		
Inflexible System	5	
Redundant Inputs	2	
Subtotal	7	21%
<b><u>Cost</u></b>		
Unreliable/Expensive to Maintain	4	
Save Money (Labor or Material)	5	
Subtotal	9	27%
<b>Total Responses</b>	<b>33</b>	<b>100%</b>

\* Respondents Could Provide Multiple Responses

N=30

CBP-3

## WHY CSI CUSTOMERS USE THIRD-PARTY VENDORS

- Achieve a Well-Planned, Managed, Executed Project
- Create a Unique Solution of Multiple Components
- Establish "One-Stop" Shopping
- Share the Project Risks
- Cover In-House Lack of Expertise
- Establish Vendor Alliances
- Avoid Hiring for Peak Workload
- Gain State-of-the-Art Technology

## **PRELIMINARY STEPS TO AN SI DECISION**

- Recognize the Problem
- Establish an In-House Task Force
- Contract with a Consultant
- Conduct Feasibility Study
- Prepare Specifications
- Prepare Report
- Recommend Approach
- Seek Approvals

## ROLE OF OUTSIDE CONSULTANTS

Services Provided	Number of Users
Prepare/RFQ/RFP	2
Describe Options Available/ Plan of Action	3
"Reality Check"	1
Present Idea to Board of Directors	1
Evaluate RFP	1
Select Vendor	1

## SI VENDOR SELECTION STEPS

- Obtain Final Project Approval
- Prepare RFP
- Develop List of Qualified Vendors
- Solicit Responses
- Hold Bidder's Conference
- Screen Proposals
- Evaluate Proposals
- Qualify Vendors

## WHAT A CLIENT LOOKS FOR IN A CSI CONTRACTOR

- Industry Expertise
- Applications Knowledge
- Technical Knowledge and Proficiency
- Past Integration Experience
- Relationships with Third-Party Vendors
- Project Management Skills
- Risk Management Skills
- Access to Other Support Services
  - Technical Consulting
  - Operations Management
  - Testing
  - Documentation
  - Education and Training
- Effective Reporting to Corporate Management
- Pragmatic Approach to Problem Solving

## CSI PROPOSAL EVALUATION

Factor	Weight (Percent)	Range
<u>"Reasonableness" of the Solution</u>		
- Understanding of the Project	15	30%
- Technical Credibility/"Excitement"	15	10-60
<u>Cost</u>	15%	2-30
<u>Minimize Business Risk</u>		
- Timely Completion	10	5-15
- Prior Experiences	10	35%
- Financial Strength	5	2-10
- Project Management Approach	10	2-20
<u>Other Factors</u>		
- Professionalism (Capability/Flexibility)	5	N/A
- International Capability	5	N/A
- Technical Support	5	N/A
- References	5	N/A
Total	100%	

Note: Not All Factors Are Evaluated for a Given CSI Project.

## TYPICAL CSI PROJECT

Expenditure	Time Line (Percent)			
	Year 1	Year 2	Year 3	Year 4
Computer Hardware		100		
Communications Hardware			100	
Systems Software Packages		100		
Applications Software Packages			100	
Consulting	60	20	20	
Project Management Fees	40	20	20	20
Design/Integration	45	35	20	
Software Development		50	50	
Education/Training and Documentation			33	67
O & M			33	67
Other	15	30	25	30

## **KEYS TO MANAGING THE CSI IMPLEMENTATION**

- Knowledgeable Personnel
- Team Spirit
- Defined Roles
- Decision Authority
- Formal Project Reviews
- Established Testing Procedures
- Defined Performance Criteria

## UNRESOLVED IMPLEMENTATION ISSUES

- User Perception of Uniqueness
  - Vendor Can't Know Subtleties
  - Vendor Can't Be Trusted
  - User Must Be in Control
- User Culture Is Inflexible
- Risks of SI May Be Severe
  - Business Liabilities Retained by User
  - Change Control Process Ill-Defined
  - Requirements Unstable



## VENDOR PROFILES



## **INTRODUCTION: VENDOR PROFILES**

- Selection Criteria
  - Active in CSI Business
  - Older, Established vs. New, Emerging
  - Representation of 3 CSI Vendor Categories
- CSI Vendor Categories
  - Hardware Manufacturers (IBM, AT&T, DEC, Unisys)
  - Processing Services (CSC, EDS, BCS, MMDS)
  - Professional Services (AA, CTG, SHL)

## CSI VENDOR SELECTION CRITERIA

- Major, or Potentially Major, Players
- Representatives of Different Backgrounds
  - Hardware Manufacturers
  - Communications Vendors
  - Software Companies
  - Professional Services Firms
  - "Big 8" Accounting Firms
  - Aerospace Companies
- Trend Setters
- Relationship Potential for NTT

## 1987 CSI VENDOR REVENUES & MARKET VALUATION

Vendor	1987 Revenues (\$ Billions)	Current Market Valuation (\$ Billions)	Ratio (Market Value/ Revenues)
IBM	48.0	68.00	1.40
DEC	9.8	14.00	1.40
Unisys	33.6	48.00	1.40
AT&T	34.1	37.00	1.10
EDS	4.5	5.00	1.10
BCS (Parent)	15.8	73.00	4.60
MMDS (Parent)	5.2	23.00	4.40
CSC	1.0	7.30	7.30
AA & Co.	2.9	N/A	N/A
CTG	0.17	0.09	0.53
SHL	0.18	0.37	2.06

## CSI VENDOR PROFILE: IBM

World's Largest Computer and Related Services Supplier

Marketing Strength > Technical Leadership

Broad Product Line

Targets All Vertical Markets

## IBM COMPETITIVE POSITION

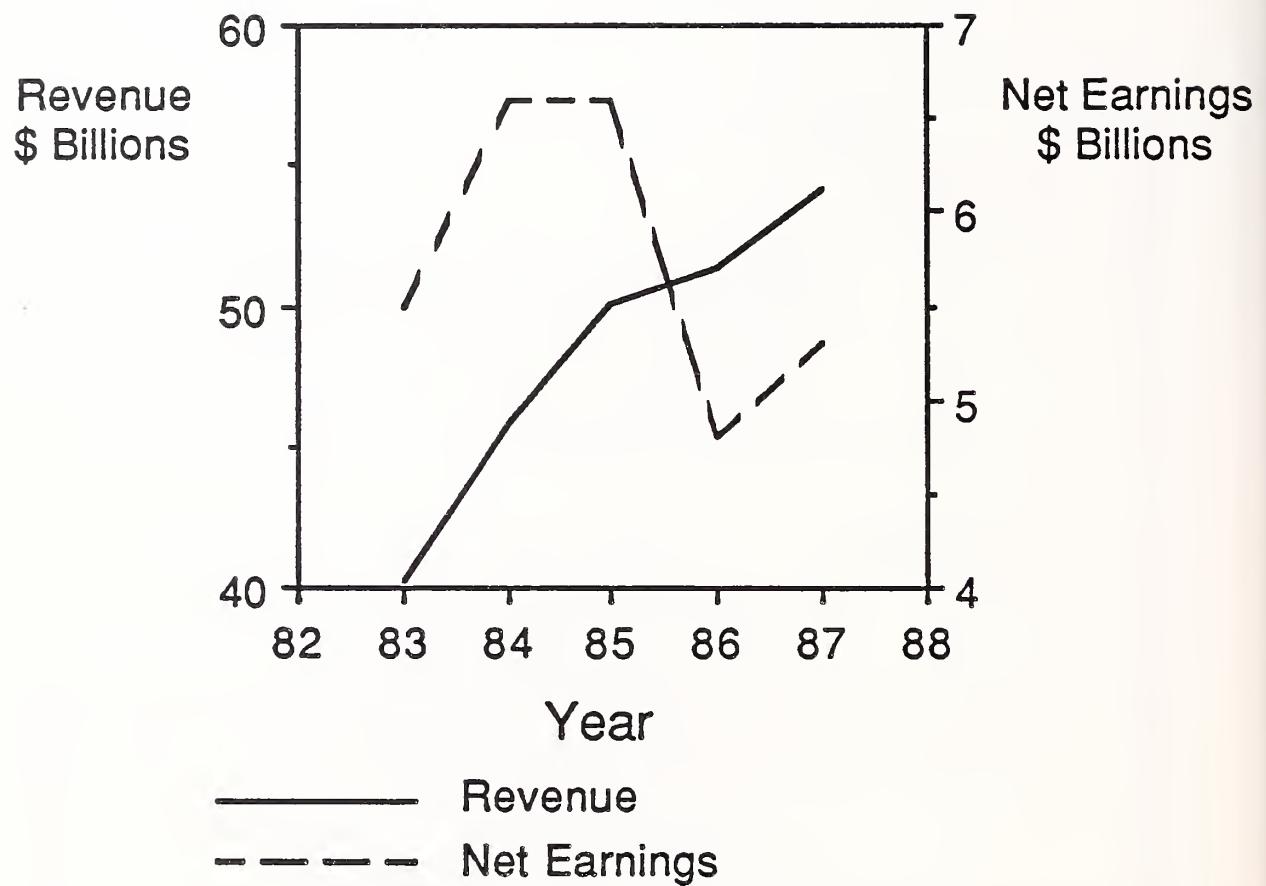
### Strengths:

- Market Share/Installed Base
- Resource Access
- Long-Term Account Relationships
- On-Site Presence

### Weaknesses:

- Response to Market Needs
- Internal Bureaucracy
- Major Markets Slowing Down
- Focused Competitors
- Product Orientation v. Solutions
- Lack of Product Integration

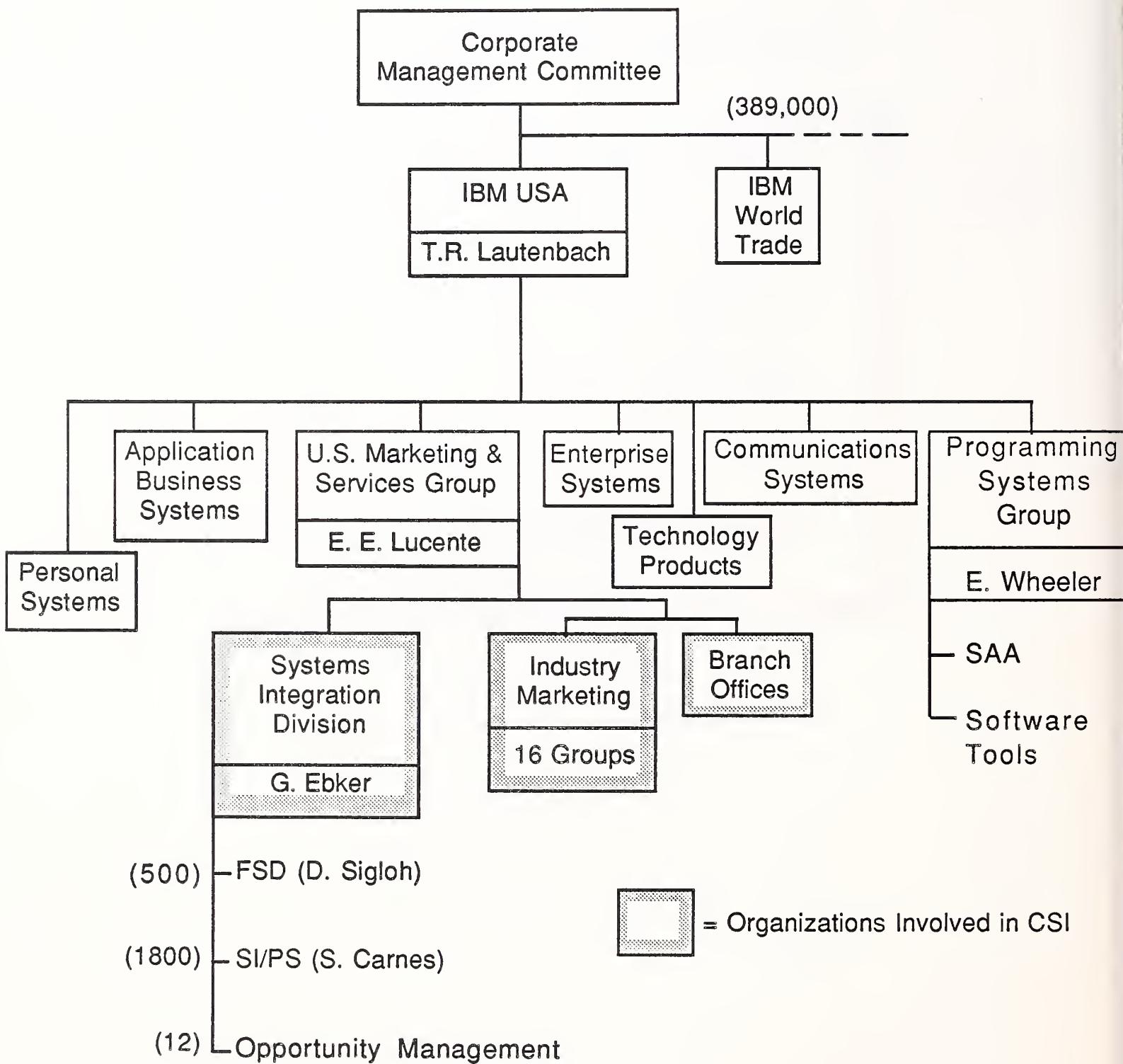
## IBM FINANCIAL SUMMARY



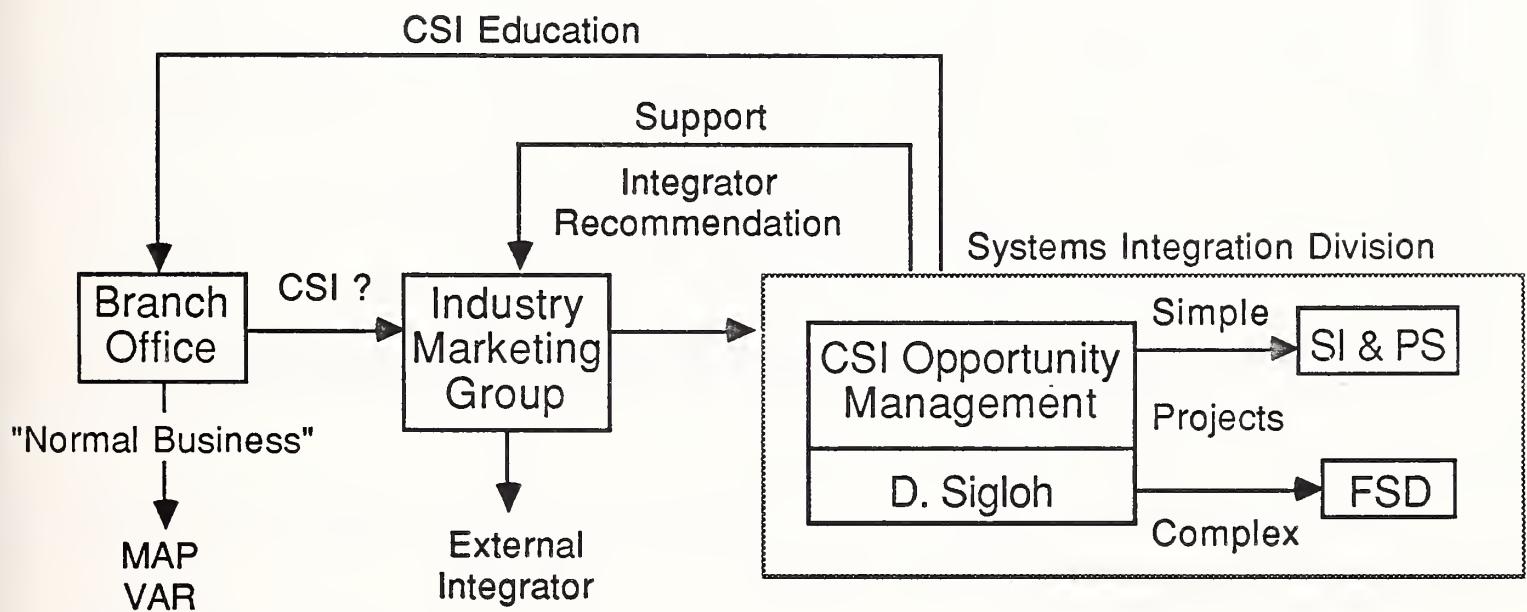
## IBM RESPONSE

- Strategy Emphasis on Software and Communications/Connectivity
- Streamline Operations
- Strengthen Product Line
- Strategic Alliances
- Decentralize Decision Making
- Massive Organizational Restructuring

## IBM'S CSI ORGANIZATION (Number of Employees)



## CSI OPPORTUNITY FLOW



## IBM CSI OBJECTIVES

IBM Response: "Become a Leader in CSI"

INPUT's View:

- Account Control
- Product Distribution Channel
- "Bridge" to Software and Service Era
- Replicate Complex Solutions

## IBM'S INTERNAL CSI CAPABILITIES EVALUATION

CSI Capability	Strengths	Weaknesses
1. Consulting	<ul style="list-style-type: none"> <li>• Functional Skills</li> </ul>	<ul style="list-style-type: none"> <li>• Vertical Skills</li> <li>• Limited Objectivity</li> </ul>
2. Design/Integration	<ul style="list-style-type: none"> <li>• FSD Organization</li> </ul>	<ul style="list-style-type: none"> <li>• SI &amp; PS Is Learning</li> </ul>
3. Project Management	<ul style="list-style-type: none"> <li>• FSD Methodology</li> </ul>	<ul style="list-style-type: none"> <li>• SI &amp; PS Improving a Methodology</li> </ul>
4. IS Hardware	<ul style="list-style-type: none"> <li>• Breadth and Depth of Product Line</li> </ul>	<ul style="list-style-type: none"> <li>• Different Architectures</li> <li>• Incompatibility</li> </ul>
5. Communications Hardware	<ul style="list-style-type: none"> <li>• CBX from ROLM</li> </ul>	<ul style="list-style-type: none"> <li>• Data Communications Products</li> <li>• Very Limited Offerings</li> </ul>
6. Software Development	<ul style="list-style-type: none"> <li>• CASE Tools</li> </ul>	<ul style="list-style-type: none"> <li>• Very Mediocre Skills</li> </ul>
7. Packaged Applications Software	<ul style="list-style-type: none"> <li>• none</li> </ul>	<ul style="list-style-type: none"> <li>• Limited in Scope and Performance</li> </ul>
8. Packaged Systems Software	<ul style="list-style-type: none"> <li>• Industry Standard Operating Systems</li> </ul>	<ul style="list-style-type: none"> <li>• Performance Management Tools</li> </ul>
9. Education, Training, and Documentation	<ul style="list-style-type: none"> <li>• Outstanding Skills</li> <li>• Geographic Coverage</li> </ul>	None
10. Network Management	<ul style="list-style-type: none"> <li>• SPECTRUM Acquisition</li> </ul>	<ul style="list-style-type: none"> <li>• Limited Products</li> <li>• IBM Only</li> </ul>
11. Service & Repair	<ul style="list-style-type: none"> <li>• Geography</li> <li>• Diagnostics</li> <li>• Parts Turnaround (Fed. Ex.)</li> </ul>	<ul style="list-style-type: none"> <li>• IBM Only</li> </ul>

## IBM ACQUISITION: SPECTRUM INFORMATION

- Products/Services: Remote Multi-Vendor Network Management Service
- Acquired From: Pacific Telesis
- 1987 Revenues: \$3 Million
- Purchase Price: Unknown (Estimated \$30 Million)
- Spectrum Role in IBM Organization

## IBM CSI STRATEGIC ALLIANCES

1. Approximately 80 Active Alliances
2. Two Types:
  - IBM as Integrator (Looking for Partners)
  - IBM as Partner (Looking for an Integrator)
3. Commercial System Integrator Program—Selection Criteria
  - Application/Systems Expertise
  - Project Management Skills
  - Prior SI Experience
  - End User Relationship
  - Legal/Contract Practices
  - Motivation to Work with IBM

## **IBM STRATEGIC PARTNERS IN CSI (Project-Based Representative Sample)**

- American Management Systems
- EDS
- Arthur Andersen & Co.
- Coopers & Lybrand
- Computer Task Group
- Computer Sciences Corp
- GE Consulting Services
- SHL Systemhouse
- Policy Management Systems
- Grumman Data Systems
- Boeing Computer Services
- Martin Marietta Data Systems
- Network Equipment Technologies

## IBM CSI CAPABILITIES EVALUATION (Vis-A-Vis Competitors)

CSI Capabilities	Internal	External Alliances
1. Consulting	Good	Strong
2. Design/Integration	Average	Strong
3. Project Management	Average	Strong
4. IS Hardware	Strong	—
5. Communications Hardware	Good	Average (Improving)
6. Software Development	Average	Strong
7. Packaged Application Software	Fair	Strong
8. Packaged Systems Software	Good	Average
9. Education, Training Documentation	Strong	Fair
10. Network Management	Average	Fair
11. Service & Repair	Strong	Weak

## IBM'S CSI MARKETING STRATEGY

1. Control CSI Opportunities
  - Onsite Presence
  - Branch Offices
2. Positioning: "Total Solution Provider"
  - Use MAP & VAR Programs for Less Complex Deals
  - Use SI&PS for Majority of CSI Projects
  - Use FSD for Complex CSI & Non-IBM Solutions
3. Customer Benefits:
  - Avoid Hiring for Peak Workloads
  - Gain Advanced Technology
  - Increase Probability of Success
  - Significant ROI
4. Target Industries:

<ul style="list-style-type: none"><li>• Manufacturing</li><li>• Financial Services</li><li>• Health Care</li></ul>	<ul style="list-style-type: none"><li>• State and Local Government</li><li>• Transportation</li><li>• Telecommunications</li></ul>
--	--
5. Applications Emphasis
  - Mission Critical Systems
  - Business > Scientific
  - Office Systems
6. Advanced Technology Centers (FSD)

## IBM PRICING GUIDELINES

- Low Flexibility v. Competitors
  - Government Contracts
  - Anti-Trust Fears
- Each Element Must Generate Margins
- Use Customer Agreements in Place
- Estimated IBM Maximum Discount:
  - Hardware – Mainframes 10%
  - Micros 35%
- Packaged Software: 15-30%
- Professional Services: 30%
- Project Management Fees Depend on the Project

## IBM'S CSI CUSTOMER BASE

- Approximately 180 CSI Projects
- Average Value \$6-7 Million
- Range \$50K to \$400M

### Sample Projects:

• Ford Motor	PC Network/Office Automation	\$400M/5 Yrs.
• Hospital Corp of America	Administrative Network	\$25M
• N. Carolina Board of Education	Administrative Network	\$2.3 M
• United Airlines	Travel Agent Network	\$250M/5 Yrs.

## **SUMMARY IBM CSI EVALUATION**

### **Capabilities:**

- Knowledge of CSI Opportunities
- Unlimited Capacity for Big Deals
- Attract Alliances/Partners
- Breadth of Internal Skills
- Ability to Invest
- Geographic Presence
- Ability to Set Standards

### **Vulnerabilities:**

- Un-Integrated Product Line
- Limited Solution Choices
- Hardware/System Solution Mindset
- Branch Sales Mentality
- Professional Services Skills
- Pricing

## **FUTURE IBM DIRECTIONS IN CSI**

### **Shift to Active CSI Marketing**

- Customer Education
- Seminars
- Advanced Technology Centers

### **Quasi-Packaged Solutions**

### **Strengthen Professional Services Skills**

### **Increasing International Content**

## CSI VENDOR PROFILE: ARTHUR ANDERSEN

- Largest of "Big 8" Accounting Firms
- 1987 Total Revenues Exceed \$2.3 Billion (FYE 8/31/87)
- Organized as Partnership
- Consulting (Worldwide)
  - 12,000 Professionals
  - \$1.0 Billion in Revenue
  - 30% Annual Growth
- I.S. Consulting
  - Pioneer
  - \$0.6 Billion in U.S.
  - 5 Years' CSI Experience

## ARTHUR ANDERSEN COMPETITIVE POSITION

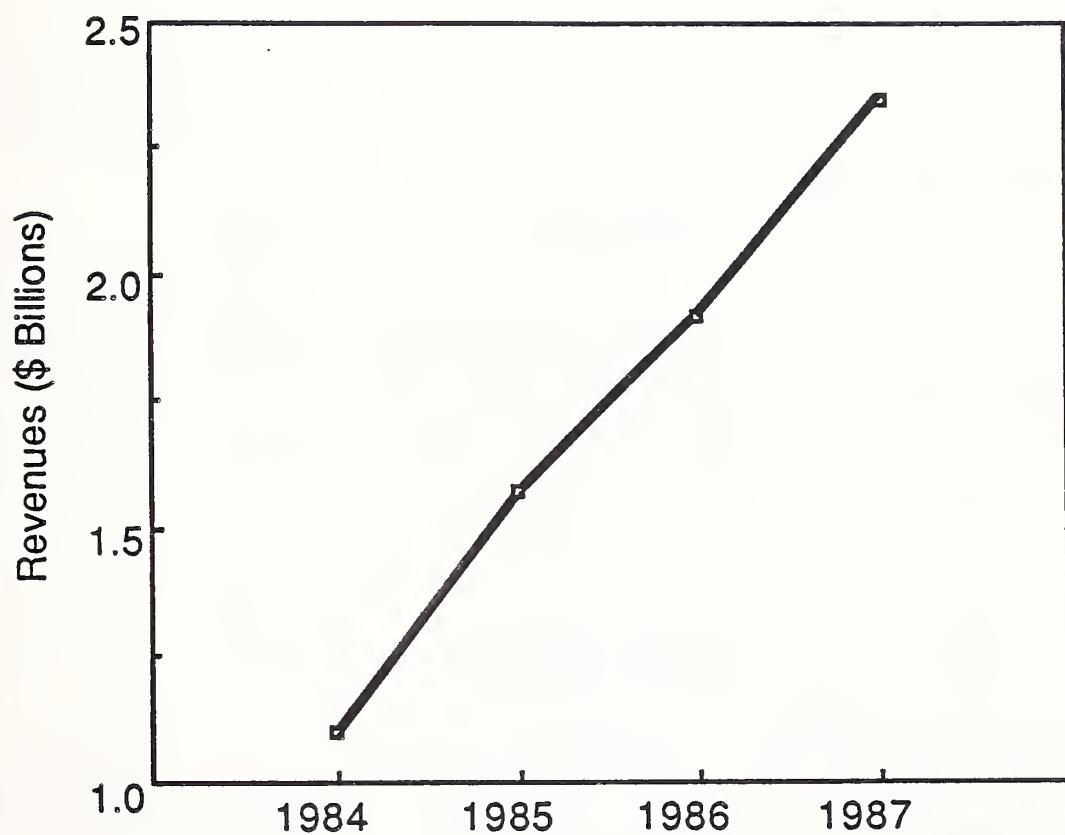
Strengths:

- High-Level Contacts in Buyer Organizations
- In-House Training for Staff
- "Professional Services Culture"
- 3rd-Party Relationships

Weaknesses:

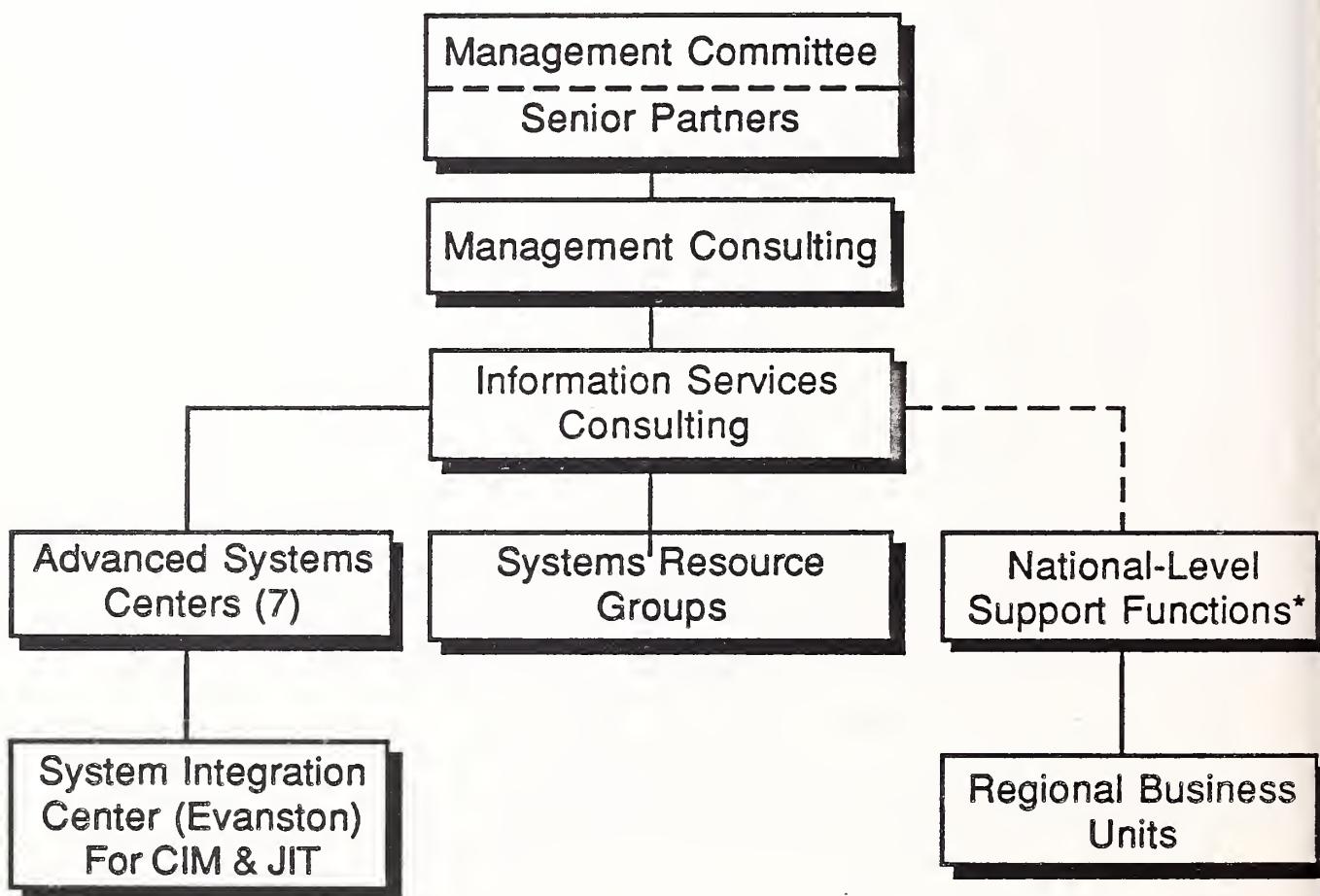
- Partnership Culture Makes Change Difficult
- Process, Not Advanced Technology, Oriented
- Non-U.S. Capabilities Not as Strong as U.S. Services

## ARTHUR ANDERSEN FINANCIAL SUMMARY



- Privately Held Partnership
- Net Income Not available

## ARTHUR ANDERSEN CSI ORGANIZATION



\* Marketing, Bid Preparation, Risk Management,  
Insurance, Purchasing, Financing

## ARTHUR ANDERSEN CSI OBJECTIVES

### Primary

- Be the Pre-eminent Provider to Top Organizations
- Provide End-to-End Business Process Solutions
- Provide Leading I.T. that Supports Business Solutions
- Treat Integrated Solution as a Natural Consequence of the Need to Remain Competitive

### Secondary

- (Offensive) Account Control
- Build Follow-On Sales of Proprietary Software

## AA INTERNAL CSI CAPABILITIES EVALUATION

Capability	Strengths	Weaknesses
1. Consulting	<ul style="list-style-type: none"> <li>• Strong Process-Orientation</li> <li>• Access to Client Senior Management</li> </ul>	<ul style="list-style-type: none"> <li>• Process Leads Business</li> <li>• Leads Technoogy</li> </ul>
2. Design/Integration	<ul style="list-style-type: none"> <li>• Structured Approach, Consistent Process</li> </ul>	<ul style="list-style-type: none"> <li>• Implementation</li> </ul>
3. Project Management	<ul style="list-style-type: none"> <li>• Integrated Approach &amp; Process</li> <li>• Timeliness</li> </ul>	<ul style="list-style-type: none"> <li>• Quality of Implementation</li> </ul>
4. I.S. Hardware	<ul style="list-style-type: none"> <li>• None</li> </ul>	<ul style="list-style-type: none"> <li>• Limited Relationships (IBM, HP)</li> </ul>
5. Communications Hardware	<ul style="list-style-type: none"> <li>• None</li> </ul>	<ul style="list-style-type: none"> <li>• Limited Relationships (IBM, HP)</li> <li>• Limited Expertise</li> </ul>
6. Software Development	<ul style="list-style-type: none"> <li>• Strong (Foundation)</li> </ul>	
7. Packaged Applications Software	<ul style="list-style-type: none"> <li>• Mac-Pac/D (Aerospace/Defense)</li> <li>• Mac-Pac (Manufacturing)</li> <li>• Fin-Pac (Financial)</li> <li>• JIT</li> <li>• CIM</li> <li>• DCS (Distr. Control System)</li> </ul>	<ul style="list-style-type: none"> <li>• Limited to Distribution, Manufacturing, Utilities</li> </ul>
8. Packaged Systems Software	<ul style="list-style-type: none"> <li>• Familiarity with Artemis, Cincom, IMS, UCCEL, Adabas</li> <li>• Foundation</li> </ul>	<ul style="list-style-type: none"> <li>• Seldom Mixed with Application S/W Communications</li> </ul>
9. Education, Training & Documentation	<ul style="list-style-type: none"> <li>• Flexibility to Customize Courseware</li> </ul>	<ul style="list-style-type: none"> <li>• None</li> </ul>
10. Network Management	<ul style="list-style-type: none"> <li>• Consulting</li> </ul>	<ul style="list-style-type: none"> <li>• Little Experience</li> </ul>
11. Service & Repair	<ul style="list-style-type: none"> <li>• Support through Regional Application Centers</li> </ul>	<ul style="list-style-type: none"> <li>• Hardware Support through Manufacturer</li> </ul>

**ARTHUR ANDERSEN  
STRATEGIC PARTNERS IN CSI  
(Limited Sample)**

Category	Vendor(s)
I.S. Hardware	IBM Hewlett-Packard Intel
Systems Software	UCCEL/CAI MSA McCormack & Dodge SAP GmbH IBM AION (Expert Systems)
Co-op Marketing	Aetna (Insurance System)
Accounting Software	TLB (Solomon III) Realworld Micro Associates

## AA & CO. CAPABILITIES EVALUATION (Vis-a-Vis Competitors)

CSI Capability	Internal	External Alliances
1. Consulting	Good	Fair
2. Design/Integration	Fair	Average
3. Project Management	Good	None
4. I.S. Hardware	None	Good
5. Communications Hardware	None	Average
6. Software Development	Strong	None
7. Packaged Applications Software	Average	Good
8. Packaged Systems Software	Good	Strong
9. Education, Training & Documentation	Average	Average
10. Network Management	None	None
11. Service & Repair	Fair	None

## ARTHUR ANDERSEN CSI MARKETING STRATEGY

1. Emphasize Business Process Change, and Changes to Management Capability in Mission-Critical Areas. Maintain Relationships

2. Positioning:

- Change Starts with the Process
- Very Large Projects Completed (>\$40 Million)
- Strong Alliances
- Industry Expertise
- Use "Showcases"

3. Customer Benefits:

- New Way to Do Business
- Industry Knowledge

4. Target Industries:

- Aerospace/Defense Manufacturing
- Distribution
- Utilities
- Electronics
- Finance

5. Applications Emphasis:

- Inventory
- Financial
- Manufacturing (JIT/CIM)

6. 7 Advanced Systems Centers

## ARTHUR ANDERSEN CSI CUSTOMER BASE

- About 40 CSI Projects
- Average Value: \$9 Million
- Ranges \$2 Million to \$80 Million
- Sample Projects:

- Electronics	Circuit Board Test & Assembly	\$52 M
- Utility	On-Line Billing System	\$30 M
- Food & Beverage	Integrated Sales/Production Planning	>\$10 M
- Retail	Finance, Inventory, & Sales Analysis System	\$10 M
- Financial	Loan Processing	\$12 M

## **SUMMARY OF ARTHUR ANDERSEN CSI EVALUATION**

- Capabilities:
  - Manage Client Process
  - Very Large Project Management Skills & Experience
  - Focus on "Professional Services" Activities
  - Focused on 4 Primary Industries
  - Emphasis on Process
- Vulnerabilities:
  - Engineering-Oriented Consulting
  - Decentralized Partnership Organization

## **FUTURE ARTHUR ANDERSEN CSI DIRECTIONS**

- Move CSI Responsibility from Local Profit Centers to National Level
- More Alliances, Joint Ventures for Target Markets
- Will Not Pre-empt Suppliers
- More Client Staff on "CSI Team"

## CSI VENDOR PROFILE: EDS

Pioneered "Facilities Management" Concept

NOW: Sixth largest vendor of professional services

AND: Fifth largest vendor of CSI services

AND: Nation's largest independent data processor for banks

AND: World's largest data processor for credit unions

Wholly owned subsidiary of General Motors since October 1984; GM work represents about 70% of EDS revenues.

6 Years' CSI experience

## EDS COMPETITIVE POSITION

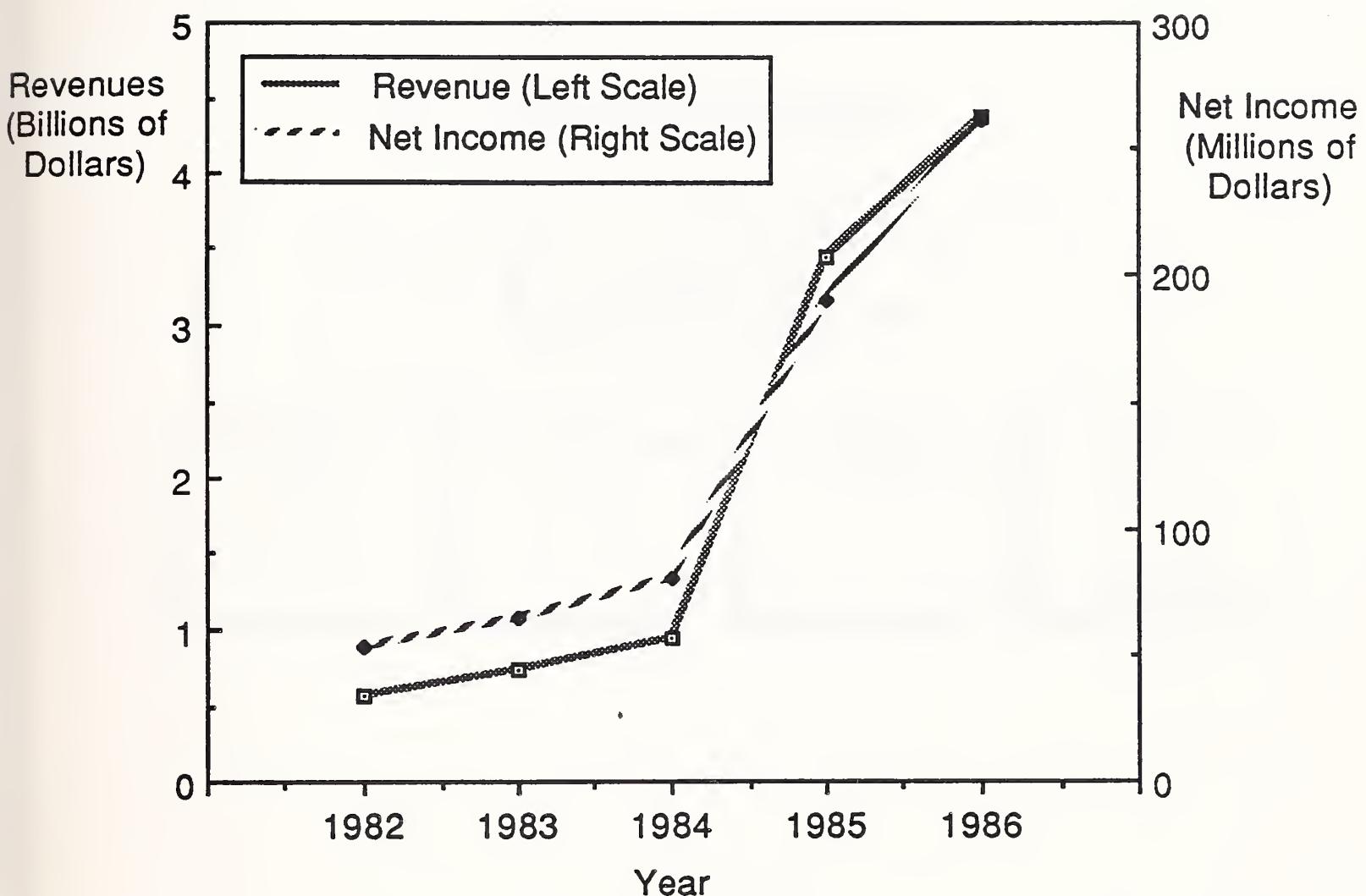
Strengths:

- Understanding of New Technologies
- >80% Contract Renewal Rate for State/Federal Government Contracts
- Extensive Contacts in Banking, Financial, and Insurance Industries

Weaknesses:

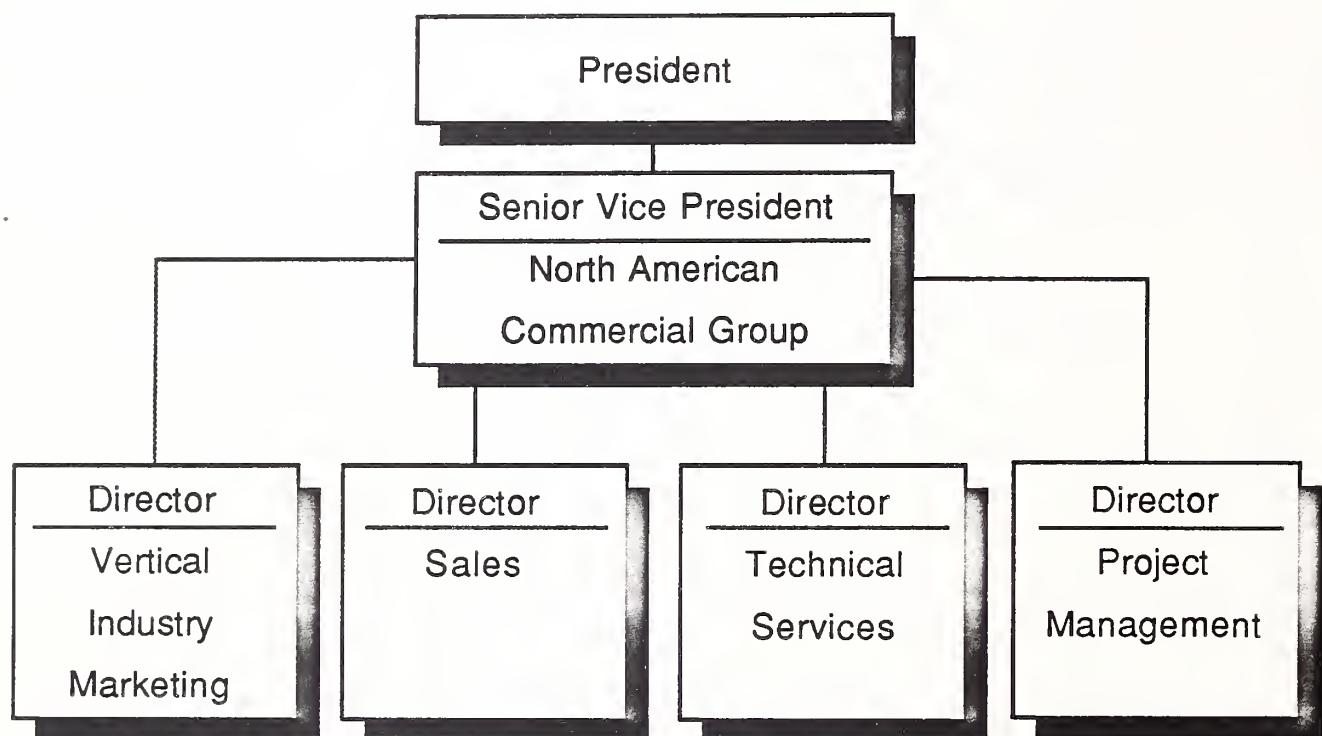
- GM Projects Are a Significant Drag on EDS' Resources
- Facilities Management/Processing Services Mentality
- "Inbred" Senior Management
- Lack of Local Sales Offices in U.S.

## EDS FINANCIAL SUMMARY



1987 CSI Revenue: \$130 Million

## EDS' CSI ORGANIZATION



## **EDS' CSI OBJECTIVES**

- Use CSI Business to Feed Facilities Management Contracts
- Profitable CSI Operation

## EDS' INTERNAL CSI CAPABILITIES EVALUATION

	CSI Capability	Strengths	Weaknesses
1.	Consulting	<ul style="list-style-type: none"> <li>• Large Project Expertise</li> </ul>	<ul style="list-style-type: none"> <li>• "Stiff Style"</li> <li>• Lack of Flexibility</li> </ul>
2.	Design/Integration	<ul style="list-style-type: none"> <li>• "Real-Time" Systems</li> </ul>	<ul style="list-style-type: none"> <li>• PC/Mainframe Integration (K-Mart)</li> </ul>
3.	Project Management	<ul style="list-style-type: none"> <li>• In-house-Developed Methodology</li> <li>• 200 Senior Managers</li> </ul>	<ul style="list-style-type: none"> <li>• Many Exposed Only to EDS Way</li> </ul>
4.	IS Hardware	<ul style="list-style-type: none"> <li>• In-house and GM Networks Yield Valuable Experience</li> </ul>	<ul style="list-style-type: none"> <li>• Depends on 3rd Parties for Hardware</li> </ul>
5.	Communications Hardware	<ul style="list-style-type: none"> <li>• Valuable Experience through In-house Network</li> </ul>	<ul style="list-style-type: none"> <li>• Depends on 3rd Parties for Hardware</li> </ul>
6.	Software Development	<ul style="list-style-type: none"> <li>• Leverage GM Work in Software Development</li> </ul>	<ul style="list-style-type: none"> <li>• Timely Completion</li> </ul>
7.	Packaged Applications Software	<ul style="list-style-type: none"> <li>• Banking, Finance, Insurance, Auto Dealers</li> </ul>	<ul style="list-style-type: none"> <li>• Linked to EDS' Processing Services or Facilities Management</li> </ul>
8.	Packaged Systems Software	<ul style="list-style-type: none"> <li>• Extensive Communications-Oriented Software</li> </ul>	<ul style="list-style-type: none"> <li>• None</li> </ul>
9.	Education, Training, and Documentation	<ul style="list-style-type: none"> <li>• Course Development</li> <li>• Documentation</li> </ul>	<ul style="list-style-type: none"> <li>• Low Investment in Formal In-house Training</li> </ul>
10.	Network Management	<ul style="list-style-type: none"> <li>• Extensive Experience with GM Networks and EDS Net</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of Flexibility</li> </ul>
11.	Service and Repair	<ul style="list-style-type: none"> <li>• Worldwide Capabilities</li> </ul>	<ul style="list-style-type: none"> <li>• None</li> </ul>

## **EDS STRATEGIC PARTNERS IN CSI (Representative Sample)**

<b>Category</b>	<b>Vendor(s)</b>
Computer Hardware	Tandem AT&T IBM DEC
International CSI (Joint Venture) Firms	Lucky-Goldstar Olivetti Telefonica
Systems Software	Decision Systems
Applications Software	Ameritech Services

## EDS CSI CAPABILITIES EVALUATION (Vis-a-vis Competitors)

CSI Capability	Internal	External Alliances
1. Consulting	Average	None
2. Design/Integration	Average	Fair
3. Project Management	Average	Average
4. IS Hardware	None	Strong
5. Communications Hardware	None	Good
6. Software Development	Good	Average
7. Packaged Applications Software	Average	Fair
8. Packaged Systems Software	None	Fair
9. Education, Training, and Documentation	Average	Average
10. Network Management	Good	Good
11. Service and Repair	Fair	None

## **EDS CSI MARKETING STRATEGY**

- 1. Build on Vertical Industry Experience**
  - Banking and Finance
  - Manufacturing
  - Distribution
- 2. Leverage GM Experience in:**
  - Manufacturing
  - Telecommunications
- 3. Positioning**
  - Complete CSI Services Provider
  - Financially Strong Company
  - Extensive Large-Project Management Experience
  - Technical Expertise
- 4. Target Industries**
  - Manufacturing
  - Banking and Finance
  - Health Care
  - Telecommunications
  - Distribution
  - State and Local Government
- 5. Applications Emphasis**
  - "Operationally Oriented" Projects
  - Repetitive Revenues Based on Results
  - Factory
  - Inventory-Intensive
  - Some Communications Content
- 6. Controlled from Dallas**

## EDS CSI CUSTOMER BASE

About 50 CSI Projects

Average Value: \$5 Million

Range: \$1 Million to \$35 Million

### Sample Projects

- K-Mart Corp.	P-O-S	\$20 M
- Continental Teleph.	Billing System	\$5 M
- RVS Insurance (Netherlands)	Comprehensive System	Unknown
- Best Products	Retail P-O-S/ Inventory	\$20-\$30 M
- United Cooperatives (Canada)	Retail P-O-S	Unknown

## **SUMMARY: EDS CSI EVALUATION**

### **Capabilities:**

- Strong Understanding of Target 4 Vertical Markets
- Strong Technical Skills, Especially Communication Networks
- Centralized, Controlled Operation

### **Vulnerabilities:**

- Lack of Dedicated Separate CSI Organization
- Limited Agreements with Hardware Vendors
- International Coverage
- Commitment vs. "Traditional" Services

## FUTURE EDS DIRECTIONS IN CSI

- Strengthen CSI Organization
- Focus on "Operationally Oriented" Opportunities
- Increase Local Sales Presence and Technical Capabilities
- Start Signing Third-Party Agreements

## CSI VENDOR PROFILE

### ATT

Nation's Largest Network Services Provider

Technical Capability > Marketing Strength

Specialized Product Line

Serves All Vertical Markets

## ATT COMPETITIVE POSITION

### Strengths:

Market Share

Technical Expertise

Perceived Quality

Research

### Weaknesses:

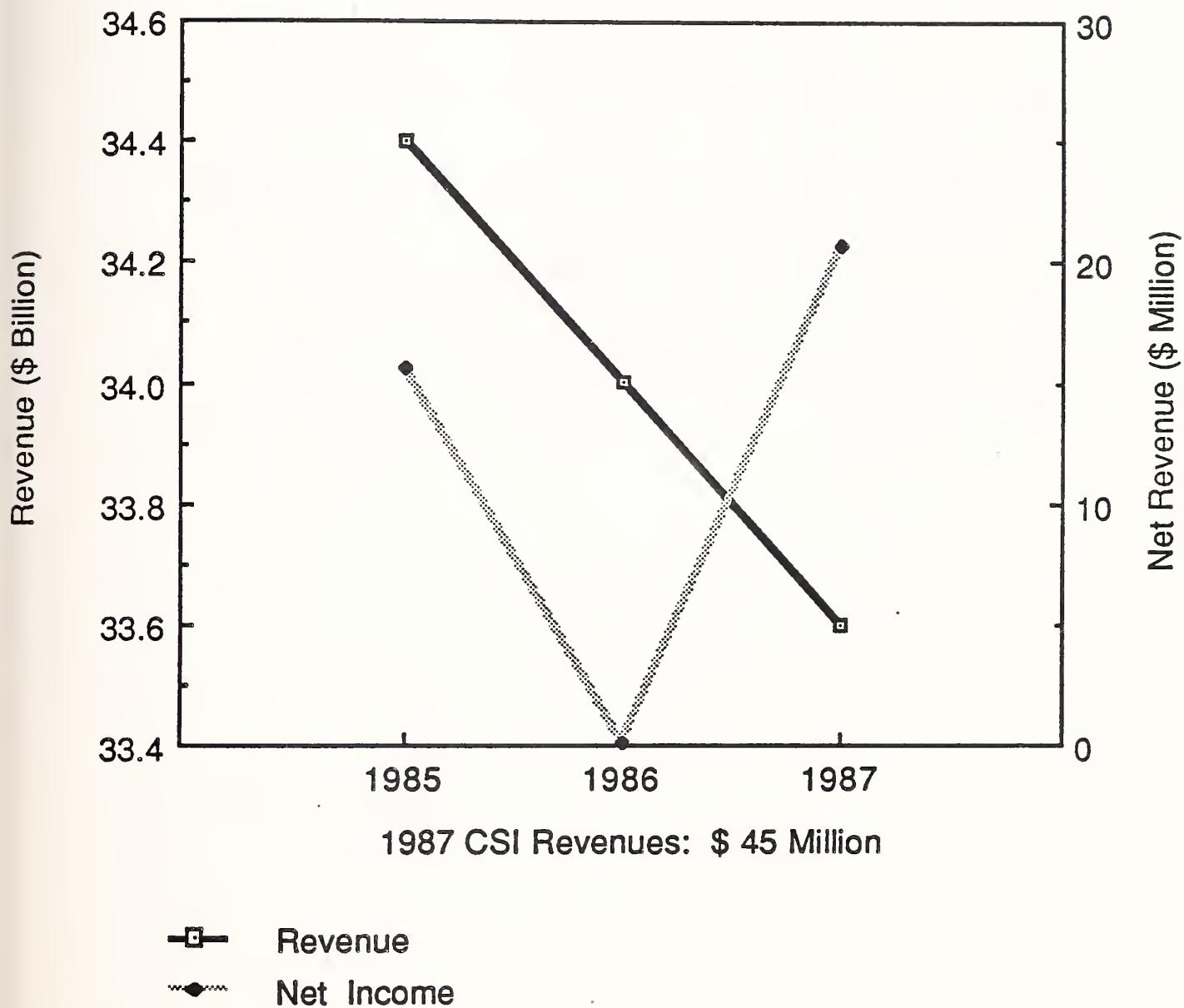
Regulatory Control

Internal Bureaucracy

Strong Competition

Narrow Focus

## AT & T FINANCIAL SUMMARY



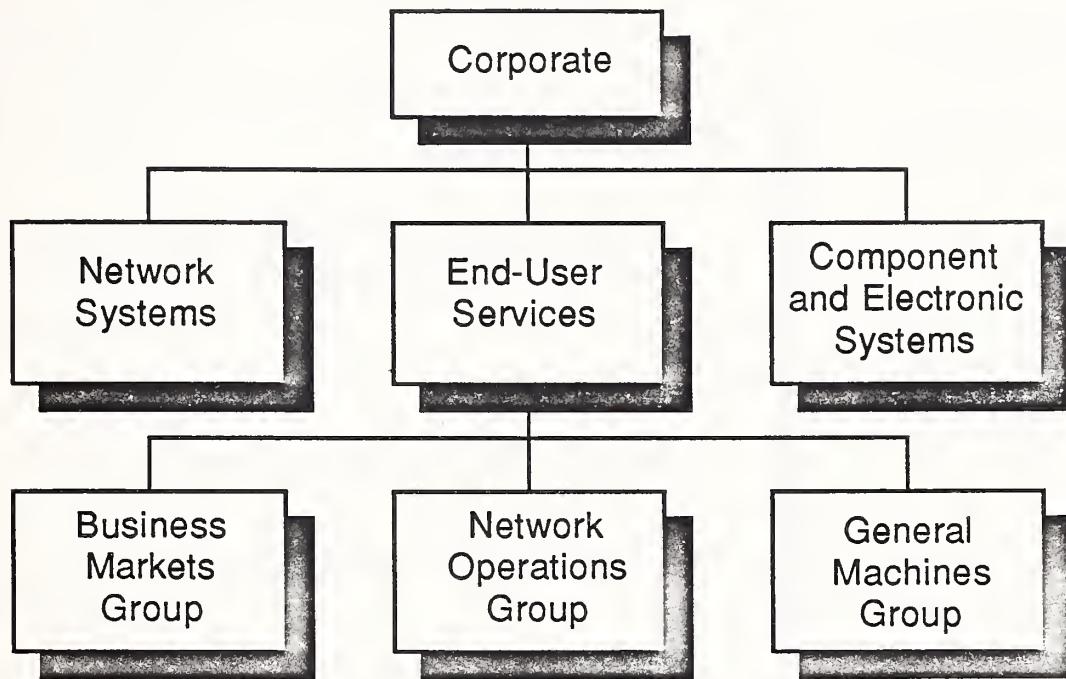
## ATT RESPONSE

Organizational Restructuring

Streamline Operations

Define Strategic Focus  
- Capitalize on Strengths

## ATT CSI ORGANIZATION



Sam Wilcoxin  
President

Commercial  
Systems  
Integration

Chuck Yates  
Vice President

Jack Scanlon  
Vice President

## ATT CSI OBJECTIVES

ATT Response:

Niche Opportunities That  
Maximize Strengths

INPUT's View:

Strength Opportunities

Opportunity Alliances

Product Integration

## ATT INTERNAL CSI CAPABILITIES EVALUATION

	CSI Capability	Strengths	Weaknesses
1.	Consulting	<ul style="list-style-type: none"> <li>• Technical Skills</li> </ul>	<ul style="list-style-type: none"> <li>• Limited Breadth</li> <li>• Underutilized</li> </ul>
2.	Design/Integration	<ul style="list-style-type: none"> <li>• Network Skills</li> </ul>	<ul style="list-style-type: none"> <li>• No Systems</li> </ul>
3.	Project Management	<ul style="list-style-type: none"> <li>• Network Experience</li> </ul>	<ul style="list-style-type: none"> <li>• No Systems</li> <li>• Limited Commercial</li> </ul>
4.	IS Hardware	<ul style="list-style-type: none"> <li>• Limited to None</li> <li>• Some Alliances</li> </ul>	<ul style="list-style-type: none"> <li>• Lack Experience</li> </ul>
5.	Communications Hardware	<ul style="list-style-type: none"> <li>• Comprehensive Skills</li> </ul>	<ul style="list-style-type: none"> <li>• Product Integration</li> <li>• Internal Bureaucracy</li> </ul>
6.	Software Development	<ul style="list-style-type: none"> <li>• Switch Systems</li> </ul>	<ul style="list-style-type: none"> <li>• Single Function</li> <li>• Limited Market</li> </ul>
7.	Packaged Application Software	<ul style="list-style-type: none"> <li>• None</li> </ul>	<ul style="list-style-type: none"> <li>• Call-Accounting Software Poor</li> </ul>
8.	Packaged Systems Software	<ul style="list-style-type: none"> <li>• None</li> </ul>	<ul style="list-style-type: none"> <li>• No Experience</li> </ul>
9.	Education, Training, Documentation	<ul style="list-style-type: none"> <li>• Excellent Schools</li> </ul>	<ul style="list-style-type: none"> <li>• Single Purpose</li> </ul>
10.	Network Management	<ul style="list-style-type: none"> <li>• Excellent</li> </ul>	<ul style="list-style-type: none"> <li>• Few</li> </ul>
11.	Service and Repair	<ul style="list-style-type: none"> <li>• Geography</li> <li>• Diagnostics</li> </ul>	<ul style="list-style-type: none"> <li>• ATT Only</li> <li>• Complexity</li> </ul>

## ATT CSI STRATEGIC ALLIANCES

ALLIANCE	PURPOSE
• TANDEM	• Switch Software • RBOC Marketing
• EDS	• Joint Bids • IS Hardware • Software Development • Project Management
• Sun Microsystems	• Computer Hardware Re-Entry

## ATT CSI CAPABILITY EVALUATION SUMMARY

	CSI Capability	Internal	Alliance
1.	Consulting	Fair	Fair
2.	Design/Integration	Fair	Average
3.	Project Management	Fair	Average
4.	IS Hardware	Weak	Average
5.	Communications Hardware	Good	—
6.	Software Development	Fair	Average
7.	Packaged Application Software	Weak	Weak
8.	Packaged Systems Software	Weak	Fair
9.	Education, Training, Documentation	Average	Weak
10.	Network Management	Strong	Weak
11.	Service and Repair	Average	Weak

# ATT MARKETING/PRICING STRATEGY

## Marketing:

- Large Accounts
- Use ATT Strengths
  - Networks
- ATT Product Integration
  - Switches
  - Premises Equipment
  - WATS

## Pricing Strategy:

- Limited Flexibility
- FCC Approval
- Assess Alternatives

## ATT CSI CUSTOMERS

- State of Wisconsin
- Ford Motor Company
- General Electric

# ATT SUMMARY EVALUATION

## Capabilities:

- Strong Telecommunications
- Extensive Resources
- Excellent Technical Skills
- Large Customer Base
- Geographic Presence

## Vulnerabilities:

- Narrow Experience Base
- Regulatory Control
- Strong Competition
- Price Restrictions
- Strategic Focus

## CSI VENDOR PROFILE: UNISYS

- UNISYS Equals Burroughs plus Sperry
- 2nd Largest Computer Hardware Manufacturer
- Broad Product Line
- Industry Marketing Focus

## UNISYS COMPETITIVE POSITION

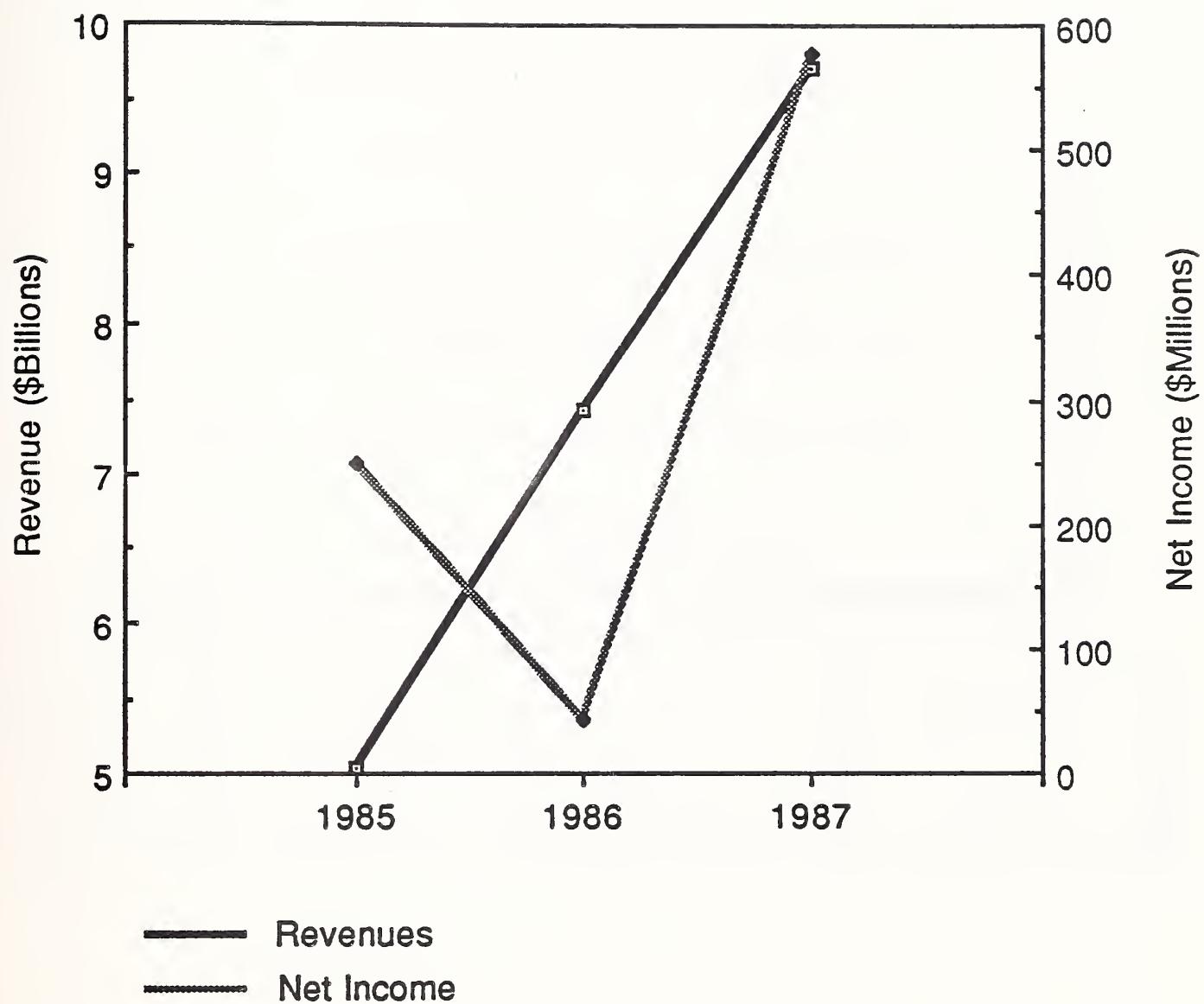
### Strengths:

- Significant Experience (Federal)
- International Experience
- Customer Base
- Technical Expertise
- Power of 2

### Weakness:

- Lack of CSI Exposure
- Product Versus Systems Orientation
- Lack of Objectivity

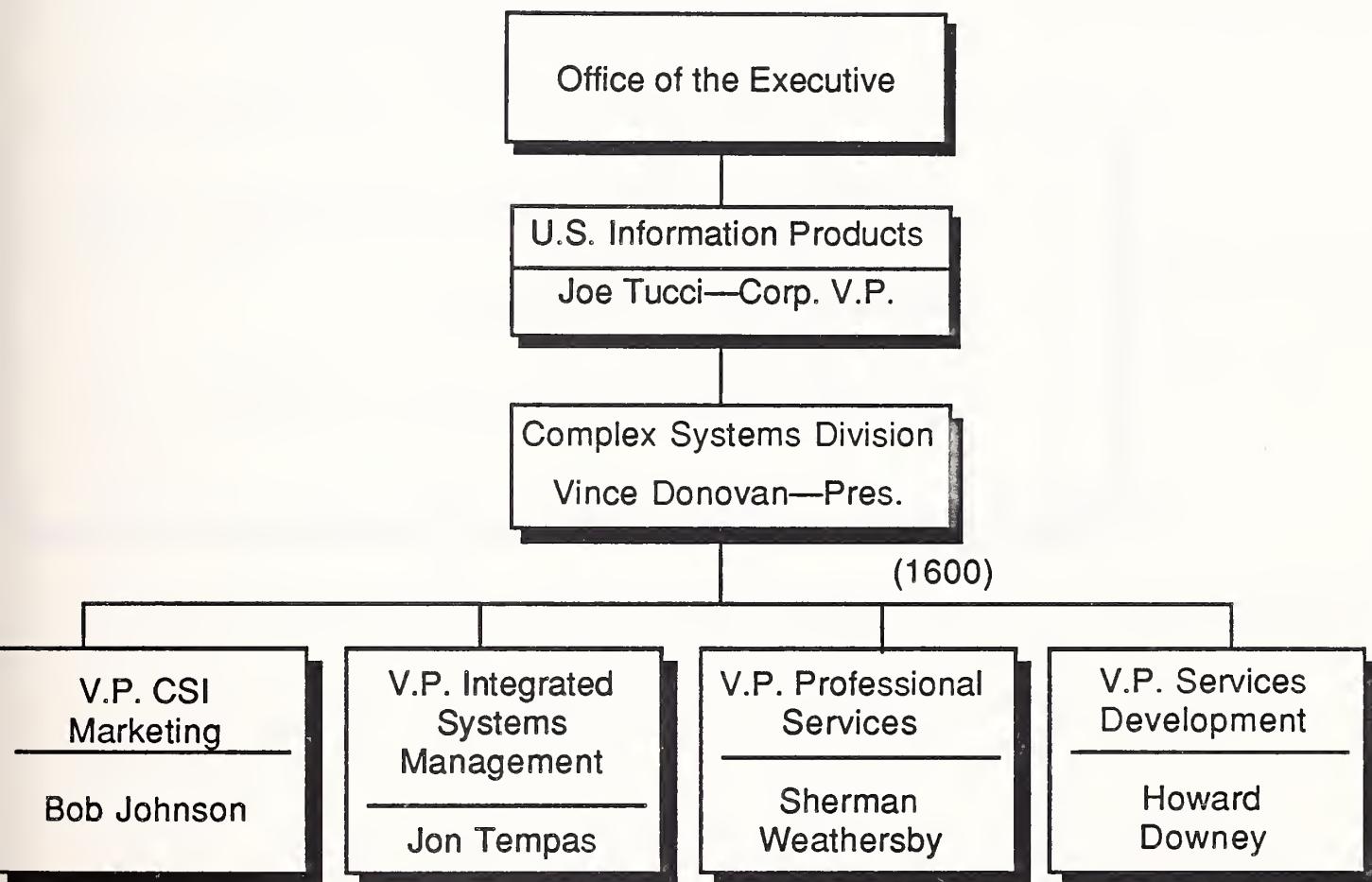
## UNISYS FINANCIAL SUMMARY



## UNISYS RECENT EVENTS

- Timeplex Acquisition ( $\approx$  \$300 Million)
- Acquiring Sun Risc Technology
- UNIX Products Growth (\$0.5 Billion in 1988)

## UNISYS CSI ORGANIZATION (Number of Employees)



## UNISYS CSI OBJECTIVES

- Maintain Competitive Posture with Industry Leader
- Increase Account Penetration
- Leverage Federal Success (SDC, Sperry)

## UNISYS INTERNAL CSI CAPABILITIES EVALUATION

CSI Capability	Strengths	Weaknesses
1. Consulting	• Functional Skills	• Limited Objectivity
2. Design/Integration	• CSD Organization	• None
3. Project Management	• Internally Developed	• None
4. IS Hardware	• Breadth and Depth	• Different Products (Sperry, Burroughs)
5. Communications Hardware	• Timeplex Acquisition	• No Telephony
6. Software Development	• CASE Tools	• None
7. Packaged Applications Software	• Manufacturing, Banking	• Other Industries
8. Packaged Systems Software	• None	• Choices
9. Education, Training, and Documentation	• Training Centers	• None
10. Network Management	• S.W.I.F.T.	• None
11. Service and Repair	• Large In-Place Organization	• Own Products

## **UNISYS CSI STRATEGIC ALLIANCES**

1. Few Formal Alliances
2. Desire Freedom of Choice Based on Project Needs
3. Has Several Software/Hardware Alliances
4. Communications Hardware Alliances with Paradyne and General Datacomm Are Likely to Be Terminated

## UNISYS STRATEGIC ALLIANCES IN CSI

<u>Product</u>	<u>Company</u>
Software Integration for Manufacturing	DRAVO Auto Sciences
MAP Protocol Communications	Industrial Networking
Financial and Administrative Software	Customized Information Systems
Financial and Accounting Software	Management Science of America
Decision Support Software	Execucom
Terminal Cluster, Controller Products	Air Land Systems
Communications Hardware	Paradyne
Communications Hardware	General Datacomm

## **UNISYS CSI MARKETING STRATEGY**

- 1. Local Marketing/Selling**
- 2. Leverage Federal Government Experience**
- 3. Respond to Prospects'/Customers' Requirements**
- 4. Target Lines of Business**
  - Financial Services
  - Public Sector
  - Industrial and Commercial
  - Communications and Airlines
- 5. Systems Solutions**
  - Competitive Advantage
  - Transaction-Oriented
- 6. CIM Center**
  - Demonstrate Manufacturing

## **UNISYS CSI EXAMPLES**

<b>Nationwide Insurance</b>	<b>Agency Automation for Marketing Complete Line of Insurance Products</b>
<b>State of Washington</b>	<b>Social Service Applications</b>
<b>Macdermid</b>	<b>Manufacturing Resource Planning</b>
<b>Sunnen</b>	<b>Manufacturing CIM System</b>

## **SUMMARY OF UNISYS CSI EVALUATION**

### **Strengths:**

- Financial Resources
- Project Management Skills
- Industry Expertise in Select Industries
- Internally Developed Applications Software
- Communications Capability

### **Weaknesses:**

- Minimal CSI Activity
- Lack of Industry Expertise
- Lack of Strategic Relationships

## **FUTURE UNISYS DIRECTIONS IN CSI**

- Leverage Skills from System Development into CSI
- Initiate Major Marketing Thrust (Bob Johnson)
- Develop Strategic Alliances

## CSI VENDOR PROFILE: DEC

- 3rd Largest Vendor in the Computer Industry
- Market Leader in Mid-Range Systems
- Broad Product Line
- Transition from Engineering/Technical/Scientific to Commercial Applications
- 3 Years' CSI Experience

## DEC COMPETITIVE POSITION

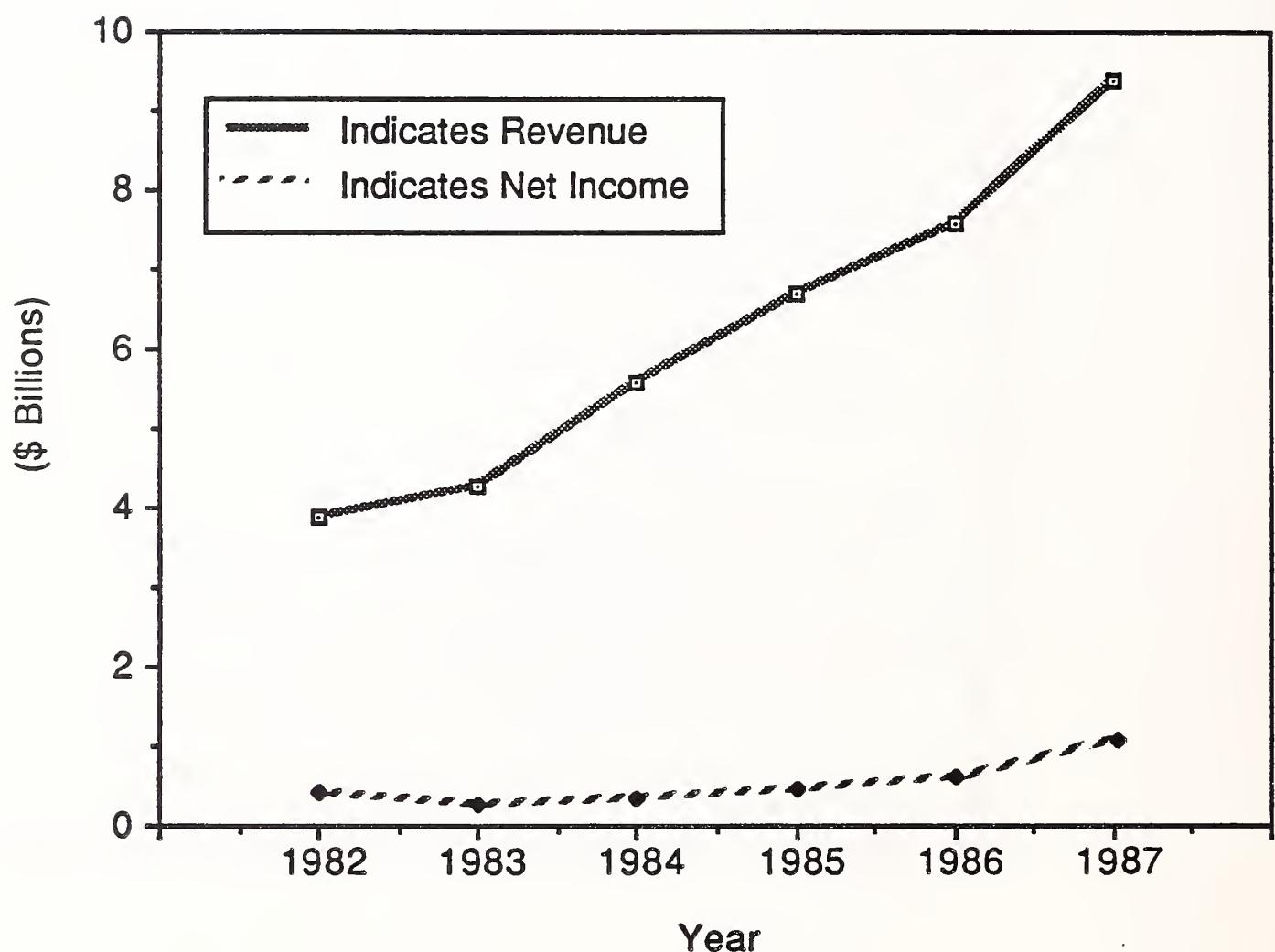
### Strengths

- Integrated Architecture
- Extensive 3rd-Party Software
- Active User Group
- Departmental Presence
- Communications

### Weaknesses

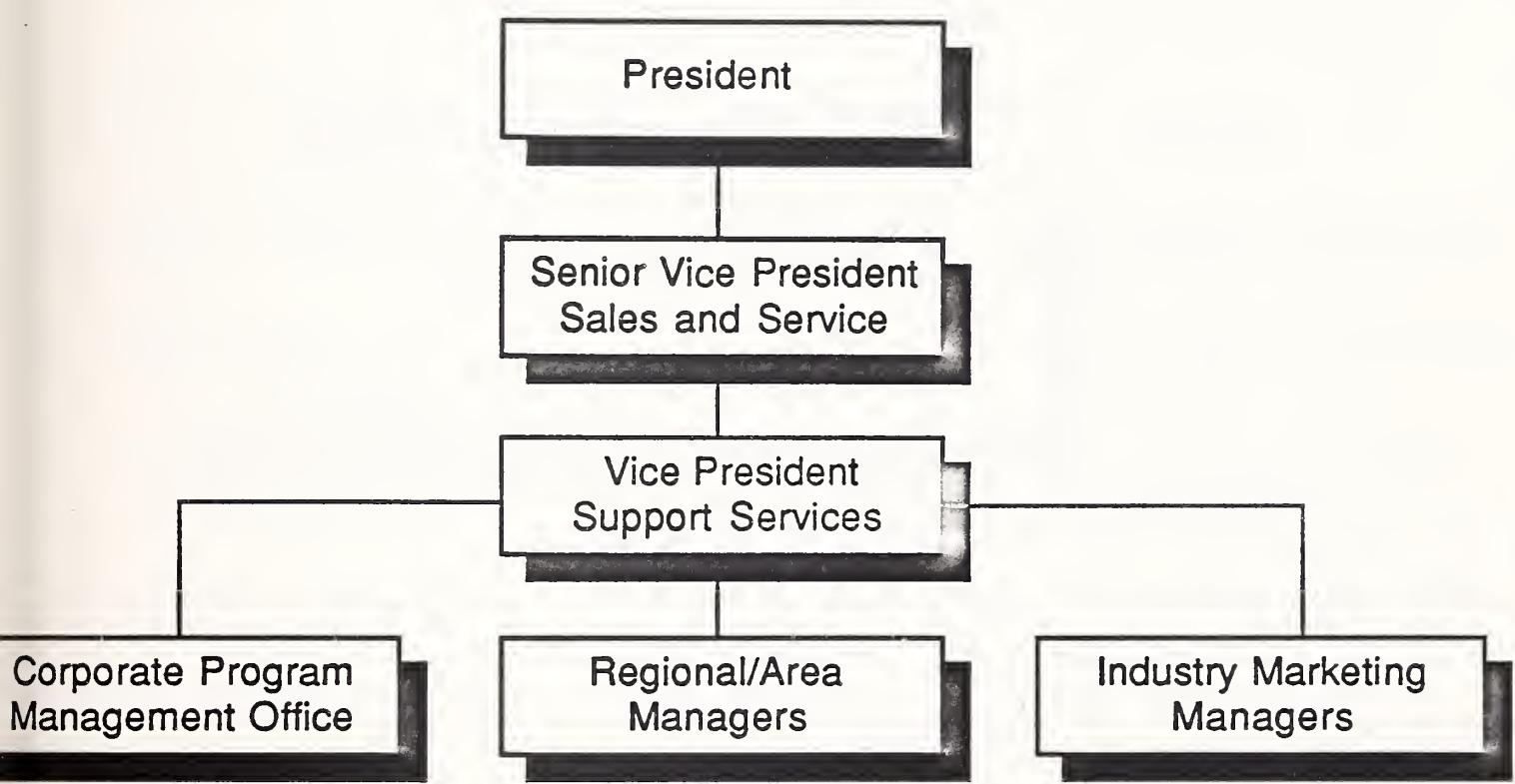
- Lack of Micro and Mainframe Capability
- Competitors' Workstation Products
- Changing Relationships in Distribution Channels
- MicroVAX to VAX: No Upward Compatibility

## DEC FINANCIAL SUMMARY



1987 CSI Revenue: \$27 Million

## DEC CSI ORGANIZATION



## **DEC CSI OBJECTIVES**

- Penetrate New Accounts
- Sell DEC Hardware and Software

## DEC'S INTERNAL CSI CAPABILITIES EVALUATION

CSI Capability	Strengths	Weaknesses
1. Consulting	<ul style="list-style-type: none"> <li>• Functional Skills</li> <li>• Process Management</li> </ul>	<ul style="list-style-type: none"> <li>• Vertical Knowledge</li> <li>• Limited Objectivity</li> </ul>
2. Design/Integration	<ul style="list-style-type: none"> <li>• Communications-Related</li> <li>• DDP-Related</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of Strategic Alliances</li> </ul>
3. Project Management	<ul style="list-style-type: none"> <li>• DEC Methodology</li> </ul>	<ul style="list-style-type: none"> <li>• Not the Best 3rd-Party Vendors for Partners</li> </ul>
4. IS Hardware	<ul style="list-style-type: none"> <li>• Integrated VAX Architecture</li> </ul>	<ul style="list-style-type: none"> <li>• No Micro or Mainframe CPUs</li> </ul>
5. Communications Hardware	<ul style="list-style-type: none"> <li>• Products Based on Industry-Standards</li> </ul>	<ul style="list-style-type: none"> <li>• No Alliances in PBX, Satellites</li> </ul>
6. Software Development	<ul style="list-style-type: none"> <li>• Extensive Experience in Minicomputers</li> </ul>	<ul style="list-style-type: none"> <li>• No Expertise in Some Verticals</li> </ul>
7. Packaged Applications Software	<ul style="list-style-type: none"> <li>• Hundreds of Third-Party Suppliers</li> </ul>	<ul style="list-style-type: none"> <li>• Limited Vertical Market Expertise In-House</li> </ul>
8. Packaged Systems Software	<ul style="list-style-type: none"> <li>• "Other" Industry Standard</li> </ul>	<ul style="list-style-type: none"> <li>• None</li> </ul>
9. Education, Training & Documentation	<ul style="list-style-type: none"> <li>• Multiple Delivery Modes</li> <li>• Flexibility</li> </ul>	<ul style="list-style-type: none"> <li>• None</li> </ul>
10. Network Management	<ul style="list-style-type: none"> <li>• Experience with Large Worldwide Network</li> </ul>	<ul style="list-style-type: none"> <li>• DEC Only</li> </ul>
11. Service & Repair	<ul style="list-style-type: none"> <li>• Geographical Coverage</li> <li>• Remote Diagnostics</li> <li>• Excellent Reliability</li> </ul>	<ul style="list-style-type: none"> <li>• Mainly DEC</li> <li>• Few Non-DEC Products</li> </ul>
12. Specialized Systems	<ul style="list-style-type: none"> <li>• DEC-Based</li> <li>• Standard Interfaces</li> </ul>	<ul style="list-style-type: none"> <li>• Only DEC is Considered</li> </ul>

## **DEC STRATEGIC PARTNERS IN CSI (Limited Sample)**

<b>Category</b>	<b>Vendor(s)</b>
Vertical Market/Sales Access	Morrison-Knudsen Engineering
Hardware Supplier	SHL Systemhouse Grumman Data Systems CSC CACI, Inc.
Technical Skills	Morrison-Knudsen Engineering
IS Hardware	Apple Computer

## DEC CSI CAPABILITIES EVALUATION (Vis-a-vis Competitors)

CSI Capability	Internal	External Alliances
1. Consulting	Good	Fair
2. Design/Integration	Good	None
3. Project Management	Average	Average
4. I.S. Hardware	Good	Fair
5. Communications Hardware	Fair	Fair
6. Software Development	Average	Good
7. Packaged Application Software	Average	Strong
8. Packaged Systems Software	Good	Average
9. Education, Training, & Documentation	Good	None
10. Network Management	Fair	None
11. Service & Repair	Good	None

## DEC'S CSI MARKETING STRATEGY

1. Win Target CSI Projects
  - Industry-Based
  - Key Account-Based
2. Positioning: One-Stop Solution Provider
  - "Digital Has It Now"
  - Coexistence (with Mainframes & Micros)
3. Customer Benefits
  - Buy a "Competitive Advantage"
  - Solid ROI
4. Target Industries
  - Telecommunications
  - Colleges/Universities
  - Aerospace
  - Banking & Finance
  - Health Care
5. Applications Emphasis
  - Mission Critical Systems
  - Departmental/OA Systems
  - Factory
  - Scientific/Technical
6. 14 Application Support Centers (ASC)

## DEC CSI CUSTOMER BASE

- About 150 CSI Projects
- Average Value: \$1.0 Million
- Range: \$0.1 Million to \$15 Million
- Sample Projects
  - Firestone
  - W. Transportation Co.
  - Bantam Doubleday Dell Publishing

CIM	\$21M/4 Years
Inventory	\$6M
Network Integration	>\$3M

## **SUMMARY: DEC CSI EVALUATION**

### **Capabilities:**

- Nearly All CSI Skills In-house
- Integrated Processor Line
- Geographic Coverage
- Technical Skills ("Call DEC to Help Connect 2 IBM CPUs!")
- Network Management

### **Vulnerabilities:**

- No Special Project Management Software
- Attitude
- Need More Alliances to Penetrate Verticals
- No Central CSI Organization to Override Matrix

## **FUTURE DEC DIRECTIONS IN CSI**

- Establish Separate CSI Organization
- Implement: DEC-Sell vs. Customer-Buy
- Develop More Industry-Specific Alliances for Application Software
- Acquire/Develop Proprietary Project Management Skills
- Increase International CSI Projects

# CSI VENDOR PROFILE

## BOEING COMPUTER SERVICES (BCS)

- Dominant Commercial Aircraft
  - BCS a Division
- BCS Primary Mission:
  - Support Company
- Serves All Vertical Markets
- Technical Skills > Marketing Ability

## **BCS COMPETITIVE POSITION**

### **Strengths:**

**Broad Computer Services Base**

**Broad Skills Base**

**Applied Research Strong**

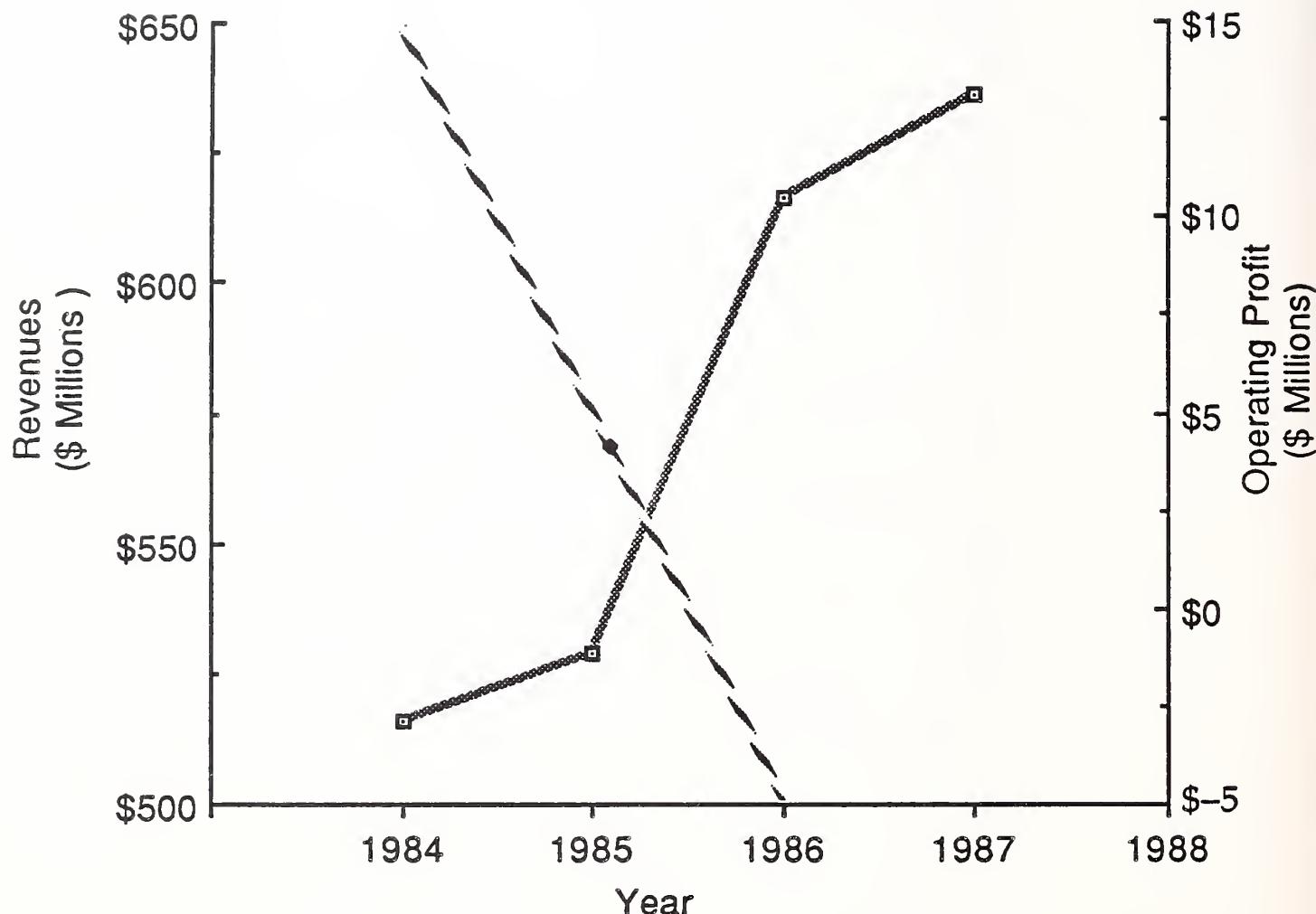
### **Weakness:**

**Parent Company Focus**

**Internal Bureaucracy**

**Lack of Corporate Commitment**

## BCS FINANCIAL SUMMARY\*

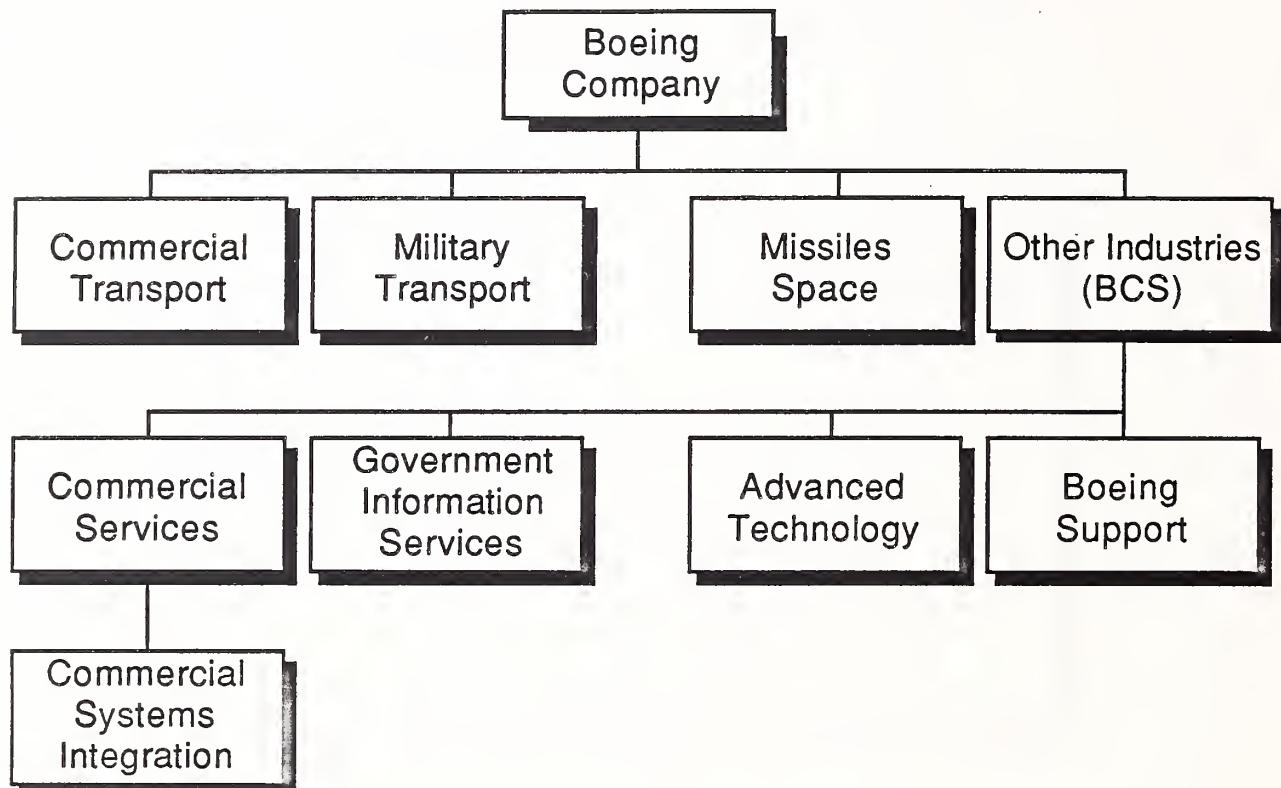


- \* Revenue figures are for 'Other Industries,' including BCS.
  - Losses for 'Other Industries' were:  
1986 = \$9 Million  
1987 = \$34 Million
  - INPUT estimates that BCS revenues equal approximately 50% of 'Other Industries.'

## BCS RESPONSE

- Refocus from Time-Sharing to Telecommunications and Systems Management
- Organizational Changes
- Realign CSI Activities
- Re-Emphasize Expertise

## BCS's CSI ORGANIZATION



- 150-200 Direct
- 12,000 Indirect

## BCS INTERNAL CSI CAPABILITIES

	CSI Capability	Strengths	Weaknesses
1.	Consulting	<ul style="list-style-type: none"> <li>• Technical Skills</li> </ul>	<ul style="list-style-type: none"> <li>• Organization</li> <li>• Bureaucracy</li> </ul>
2.	Design/Integration	<ul style="list-style-type: none"> <li>• Supercomputer Excellence</li> </ul>	<ul style="list-style-type: none"> <li>• Large-System Mentality</li> </ul>
3.	Project Management	<ul style="list-style-type: none"> <li>• Proprietary System</li> </ul>	<ul style="list-style-type: none"> <li>• Large-Project Focus</li> <li>• Lacks Flexibility</li> </ul>
4.	IS Hardware	<ul style="list-style-type: none"> <li>• Very Knowledgeable</li> <li>• Extensive Skills</li> <li>• Excellent Management Tools</li> </ul>	<ul style="list-style-type: none"> <li>• Large System Focus</li> </ul>
5.	Communications Hardware	<ul style="list-style-type: none"> <li>• Solid Knowledge Base</li> <li>• Expanding Knowledge</li> </ul>	<ul style="list-style-type: none"> <li>• Multifunctional Network Focus</li> </ul>
6.	Software Development	<ul style="list-style-type: none"> <li>• Broad Skills Base</li> <li>• Wide Experience</li> </ul>	<ul style="list-style-type: none"> <li>• Oriented to Very Large Systems</li> <li>• Some Lack Quality</li> </ul>
7.	Packaged Application Software	<ul style="list-style-type: none"> <li>• Wide Variety—Business and Engineering</li> </ul>	<ul style="list-style-type: none"> <li>• Customers Question Efficiency</li> <li>• Poor Support</li> </ul>
8.	Packaged Systems Software	<ul style="list-style-type: none"> <li>• Good Skills Base</li> </ul>	<ul style="list-style-type: none"> <li>• Little Experience</li> </ul>
9.	Education, Training, Documentation	<ul style="list-style-type: none"> <li>• Good Skills</li> <li>• Strong Organization</li> </ul>	<ul style="list-style-type: none"> <li>• Few</li> </ul>
10	Service and Repair	<ul style="list-style-type: none"> <li>• Internally Acceptable</li> </ul>	<ul style="list-style-type: none"> <li>• Lack Experience</li> </ul>

## BCS CSI STRATEGIC ALLIANCES

ALLIANCE	PURPOSE
<ul style="list-style-type: none"><li>• Tandem Computers</li><li>• Honeywell</li><li>• Scientific Computer System</li></ul>	<ul style="list-style-type: none"><li>• BCS Provides Operating System Software</li><li>• High-Speed Circuit Technology</li><li>• Supercomputer Development</li><li>• BCS Provides Operating System Software</li></ul>

**BCS**  
**CSI CAPABILITY EVALUATION**

	CSI Capability	Internal	Alliance
1.	Consulting	Average	—
2.	Design/Integration	Strong	—
3.	Project Management	Good	Weak
4.	IS Hardware	—	Average
5.	Communications Hardware	Good	Average
6.	Software Development	Good	Fair
7.	Packaged Application Software	Average	Weak
8.	Packaged Systems Software	Fair	—
9.	Education, Training, Documentation	Good	Weak
10.	Network Management	Average	Weak
11.	Service and Repair	Weak	Weak

# BCS MARKETING/PRICING STRATEGIES

## Marketing:

- Redirect Sales Force
- Target Industries
  - Manufacturing
  - Telecommunications Services
  - Any Supercomputer
- Demonstrate Capability
- Scientific > Business

## Pricing:

- Projects Over \$10-15 Million
- Leverage Prior Experience
- Price to Win

## BCS CUSTOMER BASE

Customer	Project
<ul style="list-style-type: none"><li>• State of Alabama</li></ul>	<ul style="list-style-type: none"><li>• Multiyear</li><li>• Supercomputer/ Network Integration</li></ul>

## BCS SUMMARY EVALUATION

### Capabilities:

- Extensive Technical Expertise
- National Sales Force
- Broad Resource Base
- Commitment for Large Deals

### Vulnerabilities:

- Prepackaged Solution
- Project Inflexibility
- Well-Formulated Strategy
- Large-Contract Mentality
- Corporate Commitment
- Mainframe and Supercomputer Mentality

# CSI VENDOR PROFILE

## MARTIN MARIETTA

- Highly Diversified
  - Astronautics
  - Space Systems
  - Electronics/Missiles
  - Aggregate Materials
  - Energy
  - Information Systems
- Defense Oriented
- Diversification Focus

## **MARTIN MARIETTA COMPETITIVE POSITION**

### **Strengths:**

**Strategic vs. Conventional  
Systems Balance**

**Extensive Research**

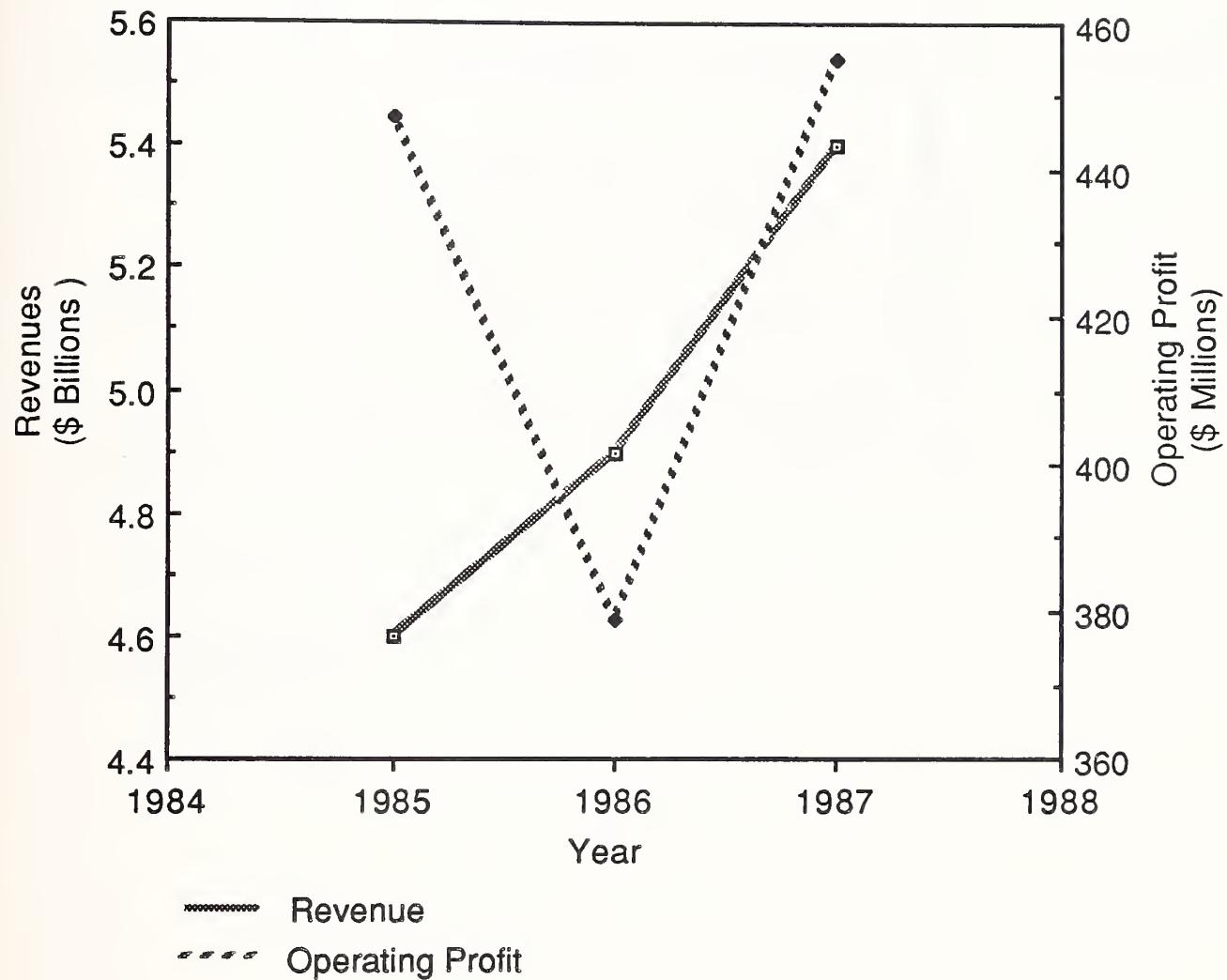
**Diversification Activities**

### **Weaknesses:**

**Generally Unknown**

**Limited CSI Products or  
Services**

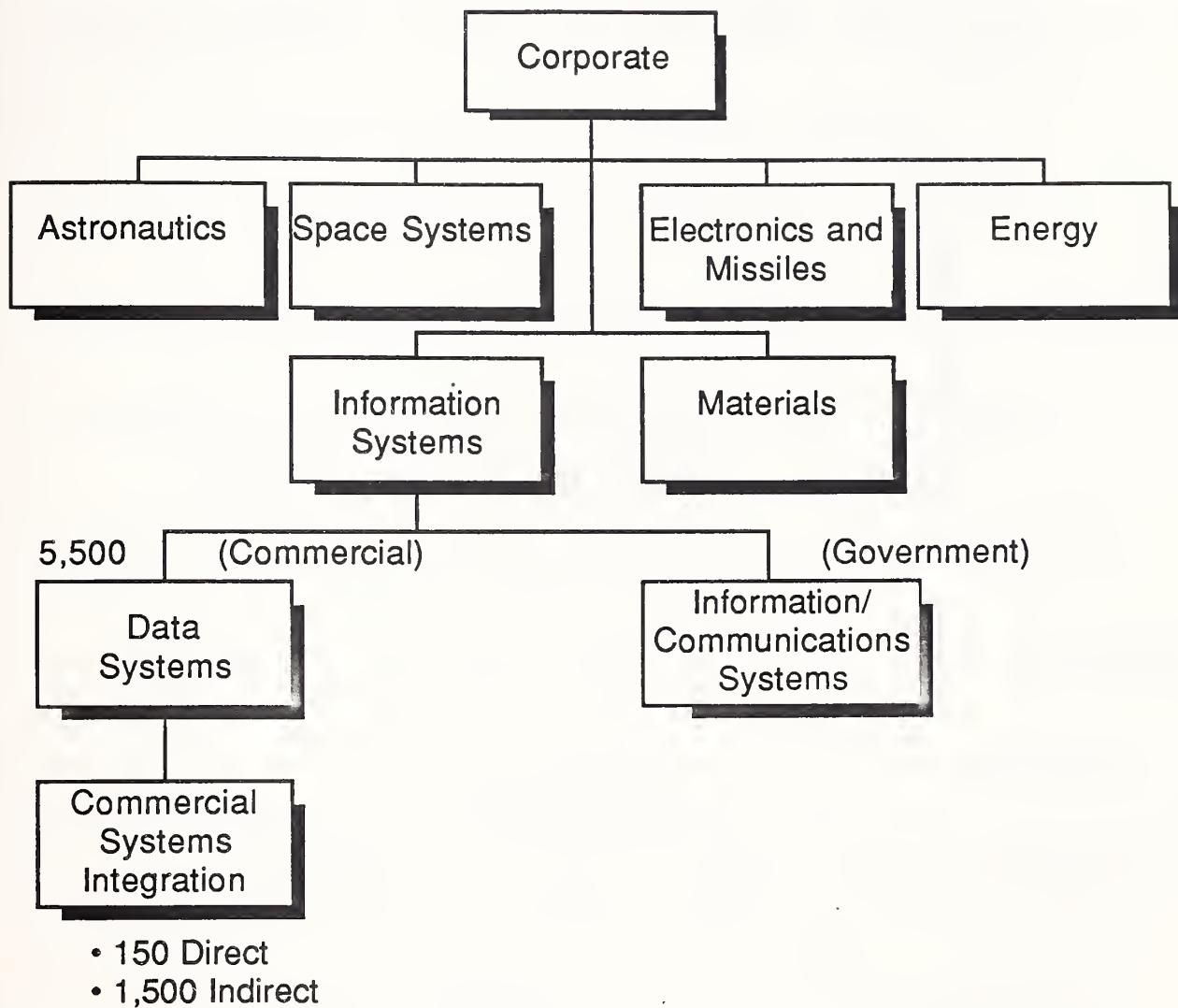
## FINANCIAL SUMMARY: MARTIN MARIETTA



## **MARTIN MARIETTA RESPONSE**

- Increase Awareness
- Build on Strengths
- Increase Commercial Activities
- Effective Alliances

# MARTIN MARIETTA CSI ORGANIZATION



## **MARTIN MARIETTA CSI OBJECTIVES**

- Establish Formal Organization
- Develop Specific Plans
- Increase Awareness

## MARTIN MARIETTA INTERNAL CSI CAPABILITIES EVALUATION

	CSI Capability	Strengths	Weaknesses
1.	Consulting	<ul style="list-style-type: none"> <li>• Complex Projects</li> <li>• Unique Solutions</li> <li>• High Technology</li> </ul>	<ul style="list-style-type: none"> <li>• Technology Orientation</li> </ul>
2.	Design/Integration	<ul style="list-style-type: none"> <li>• Strong Staff</li> <li>• Specific Posturing</li> </ul>	<ul style="list-style-type: none"> <li>• High Technology</li> </ul>
3.	Project Management	<ul style="list-style-type: none"> <li>• Proprietary Methodology</li> <li>• Complex Projects</li> </ul>	<ul style="list-style-type: none"> <li>• Adaptability</li> </ul>
4.	IS Hardware	<ul style="list-style-type: none"> <li>• Good Understanding</li> <li>• Supplier Leverages</li> </ul>	<ul style="list-style-type: none"> <li>• Large Systems</li> </ul>
5.	Communications Hardware	<ul style="list-style-type: none"> <li>• Internal Usage</li> <li>• Specific Alliances</li> </ul>	<ul style="list-style-type: none"> <li>• No Unique Expertise</li> </ul>
6.	Software Development	<ul style="list-style-type: none"> <li>• Use Experience</li> <li>• Multiple Systems</li> </ul>	<ul style="list-style-type: none"> <li>• Other Solutions</li> </ul>
7.	Packaged Application Software	<ul style="list-style-type: none"> <li>• International Linkage</li> </ul>	<ul style="list-style-type: none"> <li>• None In-House</li> </ul>
8.	Packaged Systems Software	<ul style="list-style-type: none"> <li>• None</li> </ul>	<ul style="list-style-type: none"> <li>• No Experience</li> </ul>
9.	Education, Training, Documentation	<ul style="list-style-type: none"> <li>• Internal Use</li> </ul>	<ul style="list-style-type: none"> <li>• No Marketable Experience</li> </ul>
10.	Network Management	<ul style="list-style-type: none"> <li>• Good Internal Quality</li> </ul>	<ul style="list-style-type: none"> <li>• Inadequate Resources</li> </ul>
11.	Service and Repair	<ul style="list-style-type: none"> <li>• None</li> </ul>	<ul style="list-style-type: none"> <li>• No Experience</li> </ul>

## MARTIN MARIETTA CSI STRATEGIC ALLIANCES

ALLIANCE	PURPOSE
<ul style="list-style-type: none"><li>• Hoskyns (UK)</li><li>• Hewlett-Packard</li><li>• IBM</li><li>• Others</li></ul>	<ul style="list-style-type: none"><li>• Applications Software</li><li>• Material Requirements Planning</li><li>• Manufacturing Customers</li><li>• General-Purpose Hardware</li><li>• Project by Project</li></ul>

## MARTIN MARIETTA CSI CAPABILITY EVALUATION

	CSI Capability	Internal	Alliance
1.	Consulting	Average	—
2.	Design/Integration	Good	Average
3.	Project Management	Good	Weak
4.	IS Hardware	—	Fair
5.	Communications Hardware	—	—
6.	Software Development	Fair	Weak
7.	Packaged Application Software	—	Good
8.	Packaged Systems Software	—	Good
9.	Education, Training, Documentation	Weak	Weak
10.	Network Management	Fair	Weak
11.	Service and Repair	Weak	Weak

# **MARTIN MARIETTA MARKETING/PRICING STRATEGIES**

## **Marketing:**

- Increase Awareness
  - Active Prospecting
  - Leverage Consulting
- Emphasize High Complexity
- High-Visibility Projects
- Unique Solution Focus
- Target Industries
  - Manufacturing
  - Distribution
  - Communications

## **Pricing:**

- Solidify Standard Rate
- Risk/Reward Assessment
- Apply Markup
- Modify to Win Contract
- Share Risks

## **MARTIN MARIETTA CSI CUSTOMER BASE**

- Ten Projects Completed
- Five in Progress
  - Corporate Campus Fiber Network
  - Paperless Manufacturing
  - Information Systems
  - Shop Floor Control
  - Material Requirements Planning
- Size Varies
  - Low of \$200,000
  - High of \$3.5 Million
- 1987 Revenue Estimate
  - \$100 Million Total
  - 50% International

## **MARTIN MARIETTA SUMMARY EVALUATION**

### **Capabilities:**

- Strong Financial Position
- Good Reputation
- Highly Technical
- Complex Project Knowledge
- Strong Design Skill
- Strong in Manufacturing

### **Vulnerabilities:**

- Defense Orientation
- Limited Partnering
- Low Awareness

## **CSI VENDOR PROFILE: CSC**

- Large Professional Services Firm  
Systems Integration  
Technology Expertise/Depth
- Minor Focus on Vertical Markets with  
Processing Services

## **CSC COMPETITIVE POSITION**

### **Strengths:**

- Significant Experience (Federal)
- Project Management
- Computer Partners Acquisition  
(≈ \$25 Million)

### **Weaknesses:**

- Lack CSI Exposure
- Industry Expertise
- Commercial Focus
- Lack Local Presence

## **CSC FINANCIAL SUMMARY**

- 1987 Fiscal Year:
  - Revenues \$1.03 Billion, up 23%
  - Net Income \$32.2 Million, up 35%
- 1988 Fiscal Year (3 Quarters)
  - Revenues \$843.2 Million, up 14%
- Market Value Approximately \$750 Million

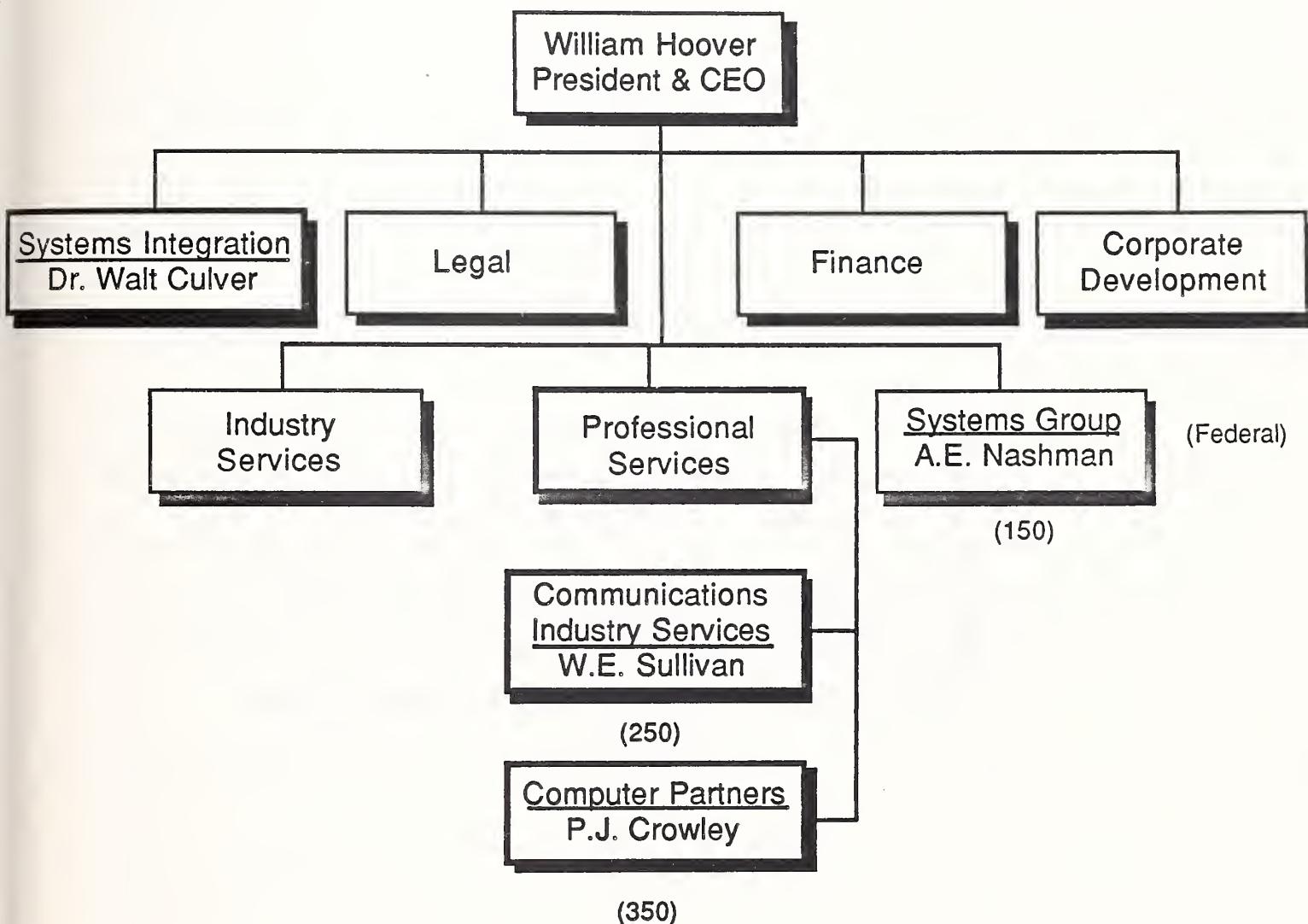
**Note: Fiscal Year Ends in March**

## CSC BUSINESS MIX

	Federal (%)	Commercial (%)
1987	70	30
Targets:		
1990	60	40
1992	50	50
\$200 Million Reserved for Acquisitions		

## CSC'S ORGANIZATION

(Number of Employees in CSI)



## **CSC CSI OBJECTIVES**

- Leverage Federal Experience to Become Commercial Leader
- Change Business Mix from 70:30 (Federal) to 50:50 by 1992

## CSC'S INTERNAL CSI CAPABILITIES EVALUATION

CSI Capability	Strengths	Weaknesses
1. Consulting	<ul style="list-style-type: none"> <li>• Functional Skills</li> <li>• Fundamental Focus</li> <li>• Total Objectivity</li> </ul>	<ul style="list-style-type: none"> <li>• Commercial/Industry Knowledge</li> </ul>
2. Design/Integration	<ul style="list-style-type: none"> <li>• Major Experience in Systems Group</li> </ul>	<ul style="list-style-type: none"> <li>• Commercial Experience</li> </ul>
3. Project Management	<ul style="list-style-type: none"> <li>• Internally Developed</li> </ul>	<ul style="list-style-type: none"> <li>• Transition to Computer Partners</li> </ul>
4. IS Hardware*	<ul style="list-style-type: none"> <li>• Diverse Experience</li> <li>• Objectivity</li> </ul>	<ul style="list-style-type: none"> <li>• -----</li> </ul>
5. Communications Hardware*	<ul style="list-style-type: none"> <li>• Built Infonet</li> </ul>	<ul style="list-style-type: none"> <li>• -----</li> </ul>
6. Software Development	<ul style="list-style-type: none"> <li>• Developed Internal CASE Capability</li> <li>• Major Experience</li> </ul>	<ul style="list-style-type: none"> <li>• NonStandard</li> </ul>
7. Packaged Applications Software *	<ul style="list-style-type: none"> <li>• None—Choice</li> </ul>	<ul style="list-style-type: none"> <li>• None</li> </ul>
8. Packaged Systems Software*	<ul style="list-style-type: none"> <li>• Choice</li> </ul>	<ul style="list-style-type: none"> <li>• -----</li> </ul>
9. Education, Training, and Documentation	<ul style="list-style-type: none"> <li>• Average</li> </ul>	<ul style="list-style-type: none"> <li>• None</li> </ul>
10. Network Management	<ul style="list-style-type: none"> <li>• Manage Infonet</li> </ul>	<ul style="list-style-type: none"> <li>• Transfer Knowledge</li> </ul>
11. Service & Repair	<ul style="list-style-type: none"> <li>• None</li> </ul>	<ul style="list-style-type: none"> <li>• Limited Capability</li> </ul>

\* Need to Partner

## **CSC CSI STRATEGIC ALLIANCES**

1. Very Few Formal Alliances
2. Alliances Chosen Based on Specific Project
3. Choose Best Partners Based on System Needs
4. No Preconceived Solutions

## CSC'S CSI MARKETING STRATEGY

1. Leverage Federal Experience
2. Grow Computer Partners
  - Open Additional Branch Offices
  - Transfer Project Management Skills
3. Target Industries
  - Manufacturing (Compufact)
  - Communications (a Division)
  - Distribution (Computer Partners)
  - Finance (Computer Partners)
  - Insurance (Computer Partners)
  - Medical (a Division)
4. Applications Emphasis
  - Mission-Critical
  - Technology-Oriented
  - Information Management
5. Penetration
  - Leverage Computer Partners
  - Corporate-Level Focus
  - Few Current CSI Contracts
6. Pricing Guidelines
  - Each Component Must Generate Margin
  - Flexibility
  - No Pattern Developed as Yet

## CSC'S MARKETPLACE PARAMETERS

### Penetration

- Leverage Computer Partners
- Corporate-Level Focus
- Few Current CSI Contracts

### Pricing Guidelines

- Each Component Must Generate Margin
- Flexibility
- No Pattern Developed as Yet

**CSC**  
**CSI CAPABILITY EVALUATION**

	CSI Capability	Internal	Alliance
1.	Consulting	Good	—
2.	Design/Integration	Good	—
3.	Project Management	Good	—
4.	IS Hardware	—	Average
5.	Communications Hardware	Average	Good
6.	Software Development	Good	—
7.	Packaged Application Software	—	Average
8.	Packaged Systems Software	—	Average
9.	Education, Training, Documentation	Fair	Fair
10.	Network Management	Good	—
11.	Service and Repair	Average	Average

## **SUMMARY CSC CSI EVALUATION**

### **Strengths**

- Financial Resources
- Well-Focused Commercial Professional Services
- Technical Expertise
- Megacontract Bidding and Execution (Federal Sector)

### **Weaknesses**

- Lack of CSI Experience
- Lack of Strategic Relationships
- Proprietary Software Development Methodology
- Commercial Responsiveness

## **FUTURE CSC DIRECTIONS IN CSI**

- Leverage Skills in Computer Partners/Federal
- Recruit Commercial Management Experience
- Open Additional Offices
- Become Dominant CSI Participant
- Proactive Marketing

# **CSI VENDOR PROFILE:**

## **COMPUTER TASKGROUP(CTG)**

**A Leading Provider of Professional Services**

**Over 60 Offices in U.S., UK, and Canada**

**Targets Commercial sector of Market**

**Uniqueness: Software Automation**

## CTG COMPETITIVE POSITION

### Strengths:

2600 Systems Engineers

Advanced Software Design and Development Tools

Presence in Major Accounts  
(75 of the Fortune 100)

Broad Geographic Coverage

Specialize in Major Vertical Markets

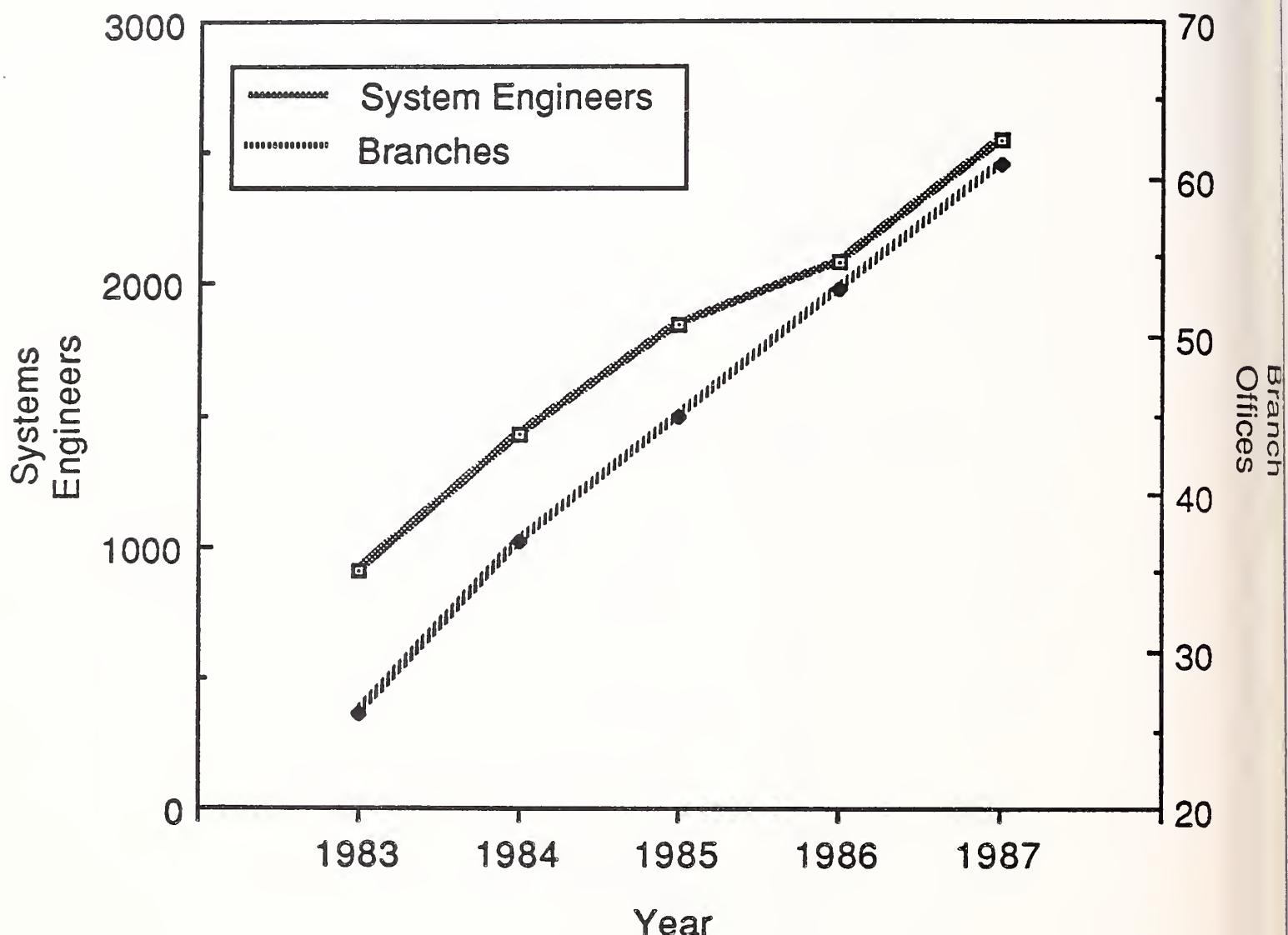
### Weaknesses:

Small CSI Customer Base

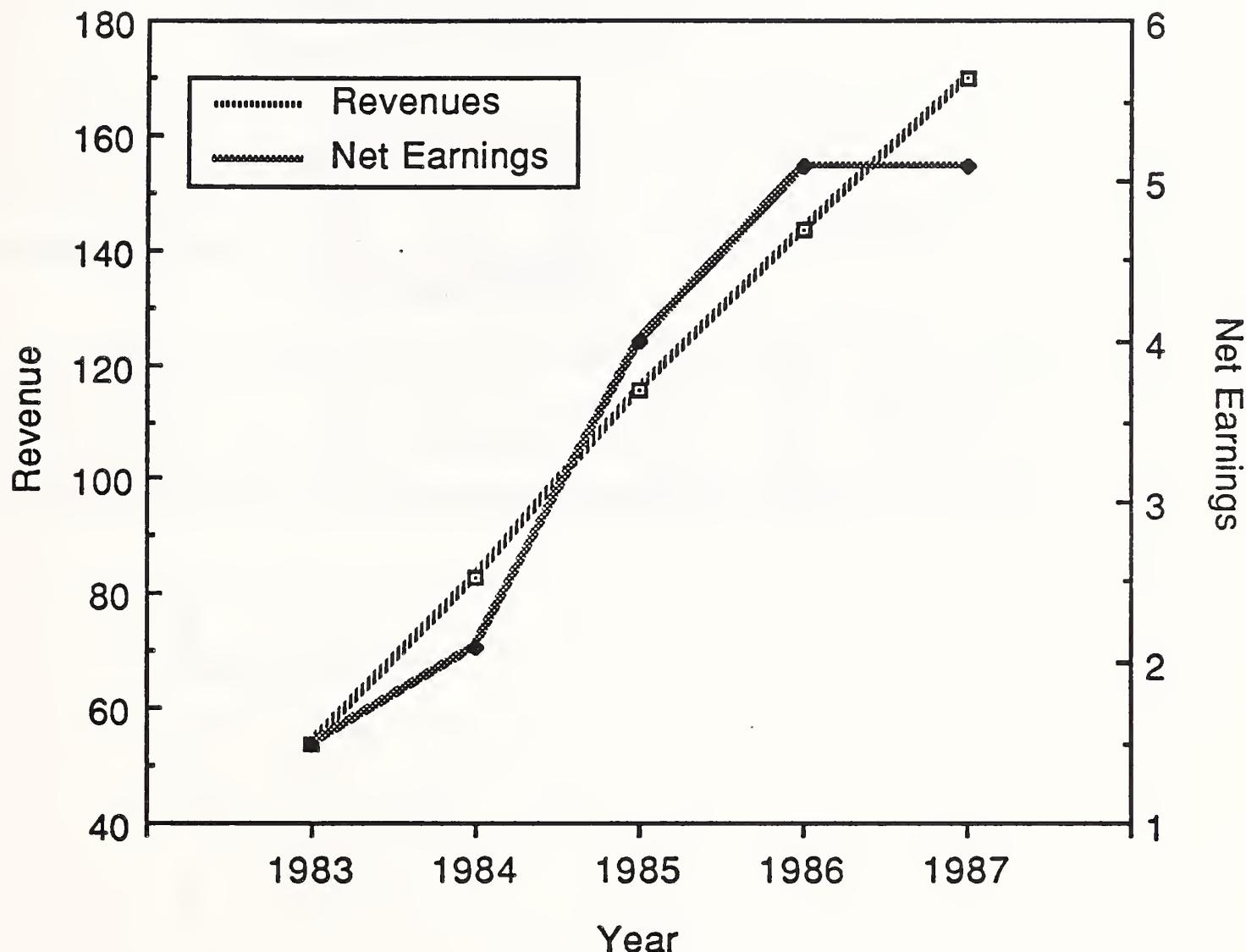
Limited Number of Strategic Alliances

\$170M Size Limits CSI Projects

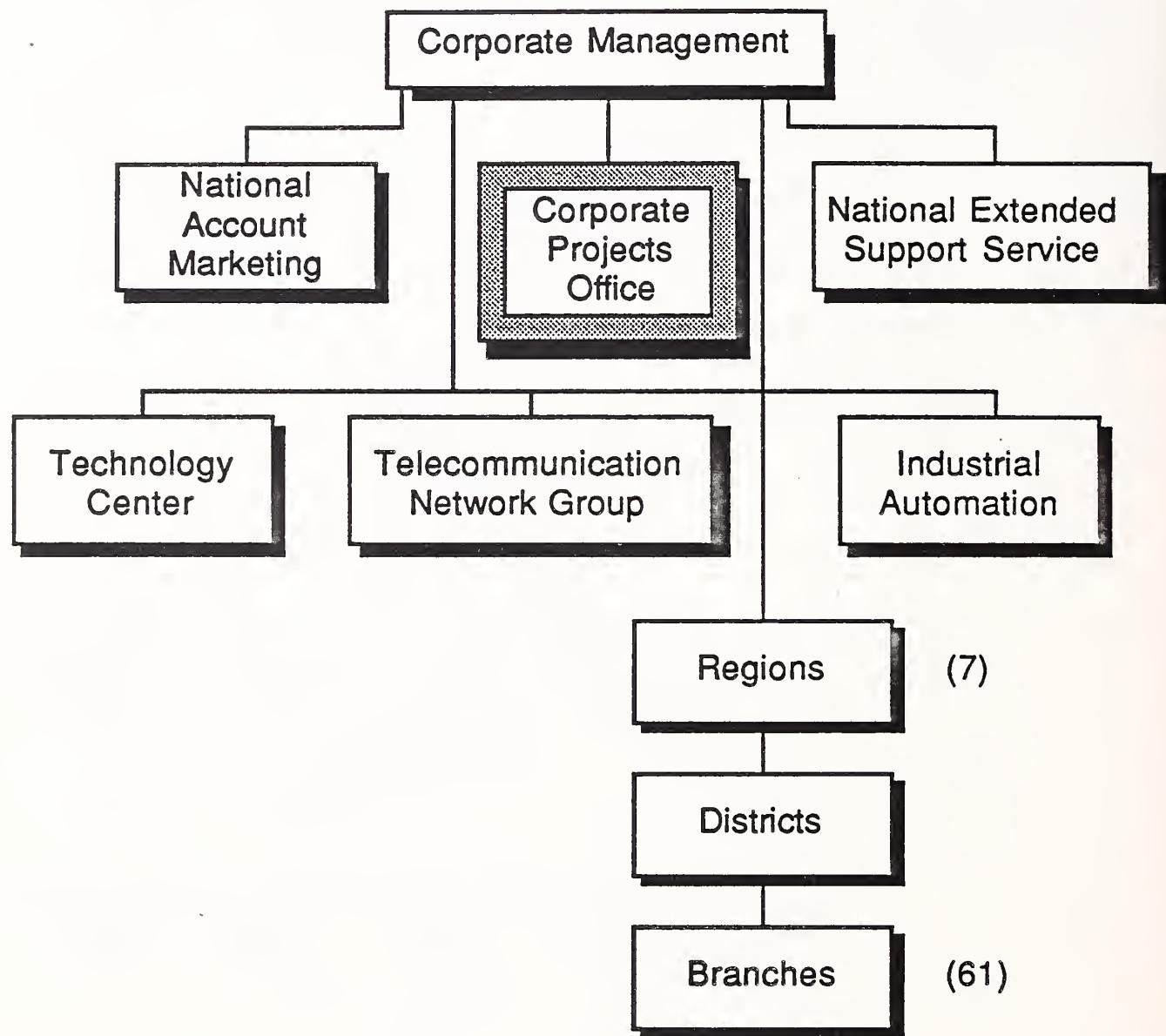
## CTG BRANCH AND PERSONNEL GROWTH



## CTG FINANCIAL SUMMARY (\$ Millions)



## CTG's CSI ORGANIZATION



## CTG's CSI OBJECTIVES

- Full Service Provider
- Increase Profit Margins
- Enhance Professional Skill Sets
- Leverage Branch Network

## CTG INTERNAL CSI CAPABILITIES EVALUATION

	CSI Capability	Strengths	Weaknesses
1.	Consulting	<ul style="list-style-type: none"> <li>• Vertical Skills</li> <li>• Functional Skills</li> </ul>	<ul style="list-style-type: none"> <li>• Does Not Cover All Vertical Markets</li> </ul>
2.	Design/Integration	<ul style="list-style-type: none"> <li>• Automated Methodology</li> </ul>	<ul style="list-style-type: none"> <li>• Limited Experience</li> </ul>
3.	Project Management	<ul style="list-style-type: none"> <li>• Advanced Technology</li> </ul>	<ul style="list-style-type: none"> <li>• Unproven on Very Large Projects</li> </ul>
4.	IS Hardware	<ul style="list-style-type: none"> <li>• Experience with IBM and DEC</li> </ul>	<ul style="list-style-type: none"> <li>• None</li> </ul>
5.	Communications Hardware	<ul style="list-style-type: none"> <li>• None</li> </ul>	<ul style="list-style-type: none"> <li>• No Formal Alliances</li> </ul>
6.	Software Development	<ul style="list-style-type: none"> <li>• State of the Art Expert Systems &amp; CASE</li> </ul>	<ul style="list-style-type: none"> <li>• None</li> </ul>
7.	Packaged Application Software	<ul style="list-style-type: none"> <li>• None</li> </ul>	<ul style="list-style-type: none"> <li>• Experience Limited to Few Verticals</li> </ul>
8.	Packaged Systems Software	<ul style="list-style-type: none"> <li>• Many Important Alliances</li> </ul>	<ul style="list-style-type: none"> <li>• None</li> </ul>
9.	Education, Training, Documentation	<ul style="list-style-type: none"> <li>• Training Centers</li> <li>• Alliances</li> </ul>	<ul style="list-style-type: none"> <li>• None</li> </ul>
10.	Network Management	<ul style="list-style-type: none"> <li>• None</li> </ul>	<ul style="list-style-type: none"> <li>• No Formal Alliances</li> </ul>
11.	Service and Repair	<ul style="list-style-type: none"> <li>• Software</li> </ul>	<ul style="list-style-type: none"> <li>• No Hardware or Network Capability</li> </ul>

## CTG CSI STRATEGIC ALLIANCES

1. Approximately 10 Active Alliances
2. Two Types:
  - Systems's Software Vendors
  - Hardware Vendors
3. Missing Important Alliances
  - Network Management
  - Communications Hardware
  - Packaged Application Software

## CTG STRATEGIC PARTNERS IN CSI

- Hardware
  - IBM
  - DEC
- Systems Software
  - Cullinet
  - Transform Logic
  - Cortrans
  - Miles Burke
  - Aion Corp
  - DACOM
  - Relational Technologies

## CTG CSI CAPABILITIES EVALUATION ( Vis-A-Vis Competitors)

	CSI Capabilities	Internal	External Alliances
1.	Consulting	Average	—
2.	Design/Integration	Good	Average
3.	Project Management	Strong	—
4.	IS Hardware	—	Average
5.	Communications Hardware	Weak	Fair
6.	Software Development	Good	—
7.	Packaged Application Software	—	—
8.	Packaged Systems Software	—	Average
9.	Education, Training, Documentation	Average	Fair
10.	Network Management	—	—
11.	Service and Repair	Average*	—

\* Cullinet

# CTG CSI MARKETING STRATEGY

1. Opportunistic Approach
  - Corporate Project Office
  - Branches
2. Positioning: Full Service Provider
  - Vertical and Functional Markets
  - Application Expertise
3. Customer Benefits:
  - Competitive Advantage
  - Advanced Technology (System Software)
  - Reduced Risk
4. Targets:
  - Financial Services
  - Industrial Automation
  - Telecommunications
  - Systems Conversions

## CTG CSI CUSTOMER BASE

- USX - Pohang Steel
- Cleveland Clinic
- Value:
  - \$25 Million Each
  - Both Multi-year Contracts

## **SUMMARY CTG CSI EVALUATION**

### **Capabilities:**

- Superior Set of System Software Tools
- Broad Geographic Coverage
- Very Large Systems Engineering Staff
- Extensive Software Development Skills and Experience
- Excellent Presence in Major Accounts

### **Vulnerabilities:**

- New Player—Only Two Contracts
- Image—Not recognized as CSI Vendor
- Missing or Weak Alliances (e.g., Communications)
- Opportunistic—No Game Plan in Place

## FUTURE CTG DIRECTIONS IN CSI

- Build Alliances (Fill Voids)
- Establish Market Presence
- Focus Branches on Opportunities
- Broaden Market Attack
  - More Verticals
  - Greater Depth
- Leverage Customer Relations

## **CSI VENDOR PROFILE: SHL SYSTEMHOUSE**

- Canada-Based Company
- Founded in 1974 as a Professional Services Vendor
- 5 Years' CSI Experience
- Seventh-Largest CSI Vendor in U.S.  
(1987 revenues: \$27 Million)
- Stock Traded on NASDAQ and Toronto Exchanges

## SYSTEMHOUSE COMPETITIVE POSITION

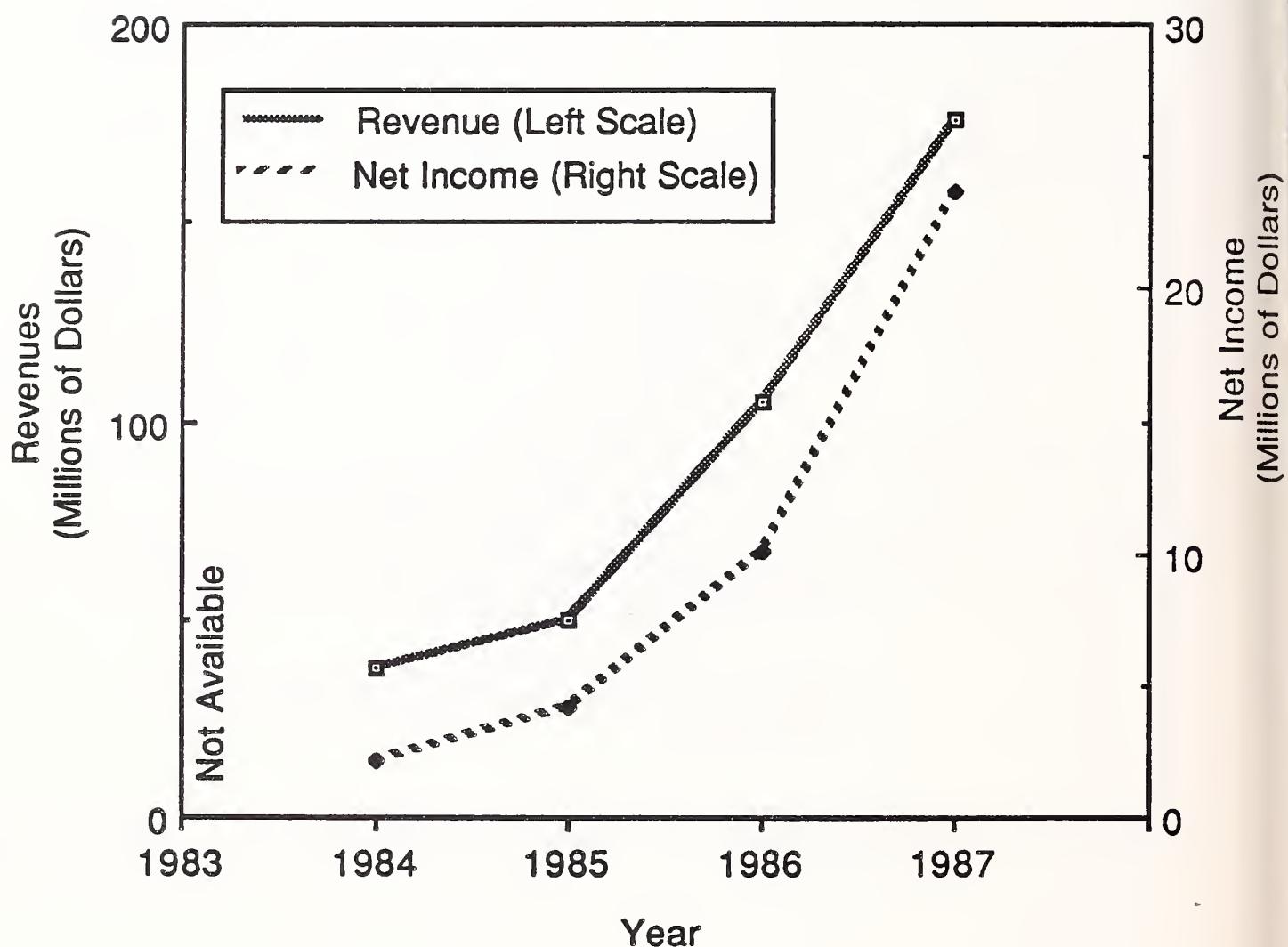
**Strengths:**

- Repeat Business
- 14 Years' Experience in SI
- Knowledge of IBM Products

**Weaknesses:**

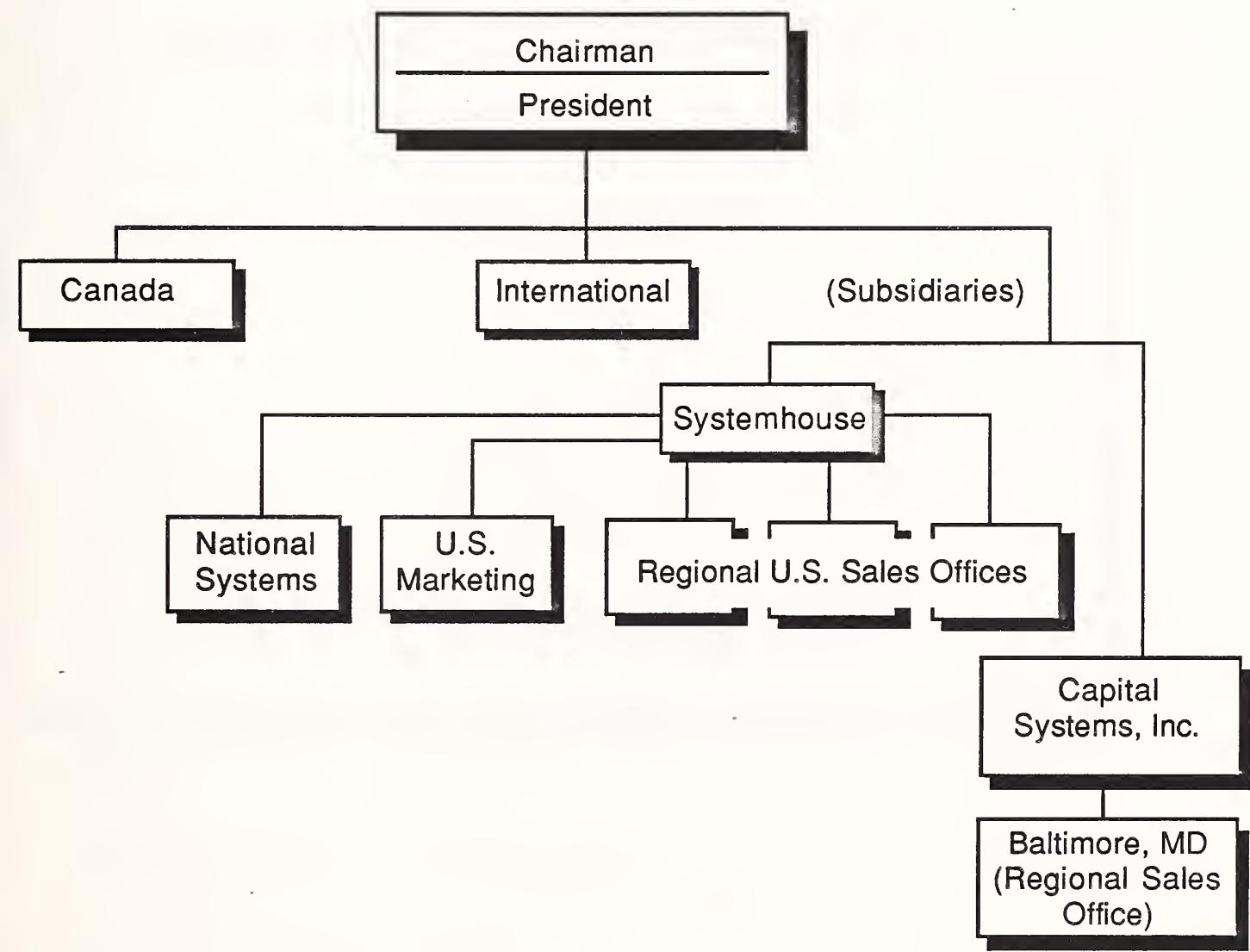
- Relatively Unknown Outside Client Base
- Larger U.S. Competitors (EDS, BCS, CSC, IBM, MMDS) for Larger CSI Projects
- Business Base Is State/Local Government Dominated

## SYSTEMHOUSE FINANCIAL SUMMARY



1987 CSI Revenue: \$29 Million

## SYSTEMHOUSE CSI ORGANIZATION



## **SYSTEMHOUSE CSI OBJECTIVES**

### **Primary**

- Focus on CSI/FSI, Not Software or Other Services

### **Secondary**

- Bid for Larger CSI Projects
- Enter Specialized Niches, New Technologies, or Applications through Acquisition
- Increase Professional-Level Training to Keep Technical/Managerial Personnel

## SYSTEMHOUSE INTERNAL CSI CAPABILITIES EVALUATION

CSI Capability	Strengths	Weaknesses
1. Consulting	• Offers Planning, Feasibility Studies, Hardware or Software Evaluation	• None
2. Design/Integration	• Integration Conversion	• "Communications-Based" Projects
3. Project Management	• Internally Developed/Tested/Used Methodology	• None
4. IS Hardware	• Possibly the Most and Best CSI Alliances	• None
5. Communications Hardware	• Alliance Partner Is Northern Telecom	• Need Additional Alliances
6. Software Development	• Full-Service Provider	• None
7. Packaged Applications Software	• Third-Party Alliances	• Limited Vertical Market Penetration
8. Packaged Systems Software	• Third-Party Alliances in RDBMS and 4GL	• Specialized Support Staff Required
9. Education, Training, and Documentation	• Documentation • "Customized" Courses	• Quality Varies by Local Office
10. Network Management	• None	• No Network Management Capability
11. Service and Repair	• Maintain Account Relationship	• Dependent on Hardware Vendors

## **SYSTEMHOUSE STRATEGIC PARTNERS IN CSI**

<b>Category</b>	<b>Vendor(s)</b>
IS Hardware	Tandem      H-P IBM           Amdahl Unisys       Wang DEC
Systems Software	Oracle (DBMS) Cognos (4GL) ADR (4GL) Relational Technologies (DBMS)
Communications Hardware	Northern Telecom

## SYSTEMHOUSE CSI CAPABILITIES EVALUATION (Vis-a-vis Competitors)

CSI Capability	Internal	External Alliances
1. Consulting	Average	None
2. Design/Integration	Strong	None
3. Project Management	Strong	None
4. IS Hardware	None	Very Strong
5. Communications Hardware	None	Strong
6. Software Development	Good	None
7. Packaged Applications Software	None	Average
8. Packaged Systems Software	None	Strong
9. Education, Training, and Documentation	Average	None
10. Network Management	None	Weak
11. Service and Repair	Average	None

## SYSTEMHOUSE CSI MARKETING STRATEGY

1. "Long-Term Relationship" Business
2. Positioning:
  - 5 Years' Experience
  - No Hardware Bias
  - Project Management Methodology
  - Addresses Human Issues of Planning (CSI Implementation)
3. Customer Benefits
  - Satisfaction Assured
  - "On Time and within Budget"
4. Target Industries
  - State and Local Government
  - International Organizations
  - Manufacturing
  - Energy
  - Distribution
5. Applications Emphasis
  - Specialty (Office Automation; Videotex; Eligibility Systems)
  - Central Systems with High Added-Value
  - Information and Records Management
6. Offices:
  - 4 in Canada
  - 5 in U.S.
  - 2 in Europe

## SYSTEMHOUSE CSI CUSTOMER BASE

Over 140 Installations in U.S. and Canada

Average Value: \$1 Million

Range: \$0.1 Million to \$14 Million

### Sample Projects

- Los Angeles County      Criminal Justice      \$12 M  
                                    System
- Safeway                      Customer Service      Unknown  
                                    System
- Columbus and              Automated              \$1.2 M  
Franklin Public              Cataloging and  
Library                      Circulation  
                                    System
- Royal Canadian              Data Network      \$13.2 M  
Mounted Police              System

## **SUMMARY: SYSTEMHOUSE CSI EVALUATION**

### **Capabilities:**

- Focus Mainly on CSI
- Technical Knowledge of Many Hardware Systems
- Many Third-Party Alliances
- Excellent Project Management Methodology
- Emphasis on Customer Satisfaction

### **Vulnerabilities:**

- No Network Management Capabilities
- Limited Geographic Presence in U.S. Market
- Not Well-Known
- Limited Experience in U.S. for Very Large CSI Projects

## **FUTURE SYSTEMHOUSE DIRECTIONS IN CSI**

- Open More U.S. Regional Sales Offices
- Address Weakness in Network Management
- More Relationships with Third-Party Application Software Vendors in Target Industries
- Build on Existing Client Relationships



## SPECIALIZED CSI VENDORS



## INTRODUCTION: SPECIALIZED VENDORS

- "Specialized"
  - Smaller
  - More Focused
- Other Dimension of CSI Business
- Potential Alliances

## **SOURCES FOR SPECIALIZED CSI VENDORS**

- Systems Software
- Turnkey Systems
- Federal Systems Integration
- Federal Systems Integration/DoD
- Telecommunications
- Professional Services

## **SPECIALIZED CSI VENDORS (SYSTEMS-SOFTWARE BASED)**

- Oracle
- Pansophic

## **SPECIALIZED CSI VENDORS (FEDERAL S.I.-BASED)**

- American Management Systems (AMS)
- Analysts International
- Bolt, Beranek & Newman

**SPECIALIZED CSI VENDORS  
(FEDERAL S.I./DOD-BASED)\***

Company	City, State	Total Company Revenues
• CACI	Arlington, VA	\$106 Million
• Computer Data Systems	Rockville, MD	\$52 Million
• Dynamics Research Corp.	Wilmington, MA	\$61 Million
• ERC International	Fairfax, VA	\$95 Million
• Group Operations	Washington, DC	\$6 Million
• Input/Output Computer Services	Waltham, MA	\$20 Million
• Maxima Corporation	Rockville, MD	\$36 Million
• OAO Corporation	Greenbelt, MD	\$70 Million
• Perceptronics	Woodland Hills, CA	\$38 Million
• Planning Research Corp.	McLean, VA	\$180 Million
• Systems Research & Applications	Arlington, VA	\$20 Million
• Telos Corporation	Santa Monica, CA	\$78 Million
• Titan Systems Corp.	San Diego, CA	\$40 Million

\* Restricted Companies Due to DOD Projects

## **SPECIALIZED CSI VENDORS (Professional-Services-Based)**

- CAP Gemini DASD
- AGS
- Data Architects
- General Electric Consulting Services
- Systems & Computer Technology (SCT)
- "Big 8" Accounting Firms
  - Arthur Young
  - Coopers & Lybrand
  - Price Waterhouse
  - Peat Marwick Main

## CSI SPECIALIZED VENDORS

- Not Exhaustive List
- One Page Summaries
- Companies of Highest Interest to NTT

**Company: AGS Computers, Inc.**

Location: Mountainside, NJ  
Founded: 1967

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**Principal Business**

Products/Services: Professional Services, microcomputer distribution  
Markets Served: Telecommunications, banking & finance, Computer Manufacturers, State & Local Governments, Brokerage, Insurance

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**Financial Information**

1987 Company Revenues: \$496 million  
1987 CSI Revenues: \$20 million  
1987 Earnings: \$5.8 million  
Net Worth: \$106 million  
Market Valuation: \$234 million

---

**Organization**

Total Employees: 3,439  
CSI Employees: 300-400  
CSI-Related Subsidiaries:  
1. AGS Genasys Corporation (Rockville, MD)  
2. AGS Information Services (Mountainside, NJ)

---

**CSI Activities**

CSI Capabilities: Project Management, Consulting Services, Design/Integration, SW Development, Education/Training/Documentation, Service and Repair  
Strategic Alliances: IBM, DEC, Apollo

---

**Key Strengths and Weaknesses**

Strengths: 

- UNIX technical skills and capabilities
- Knowledge of DEC and IBM connectivity
- Experience with IBM, CDC, Univac, Basic 4, Data General, and DEC computers

  
Weaknesses: 

- Microamerica subsidiary for hardware distribution is nearly 50% of revenues
- No international presence

**Company:** American Management Systems, Inc.

**Location:** Arlington, VA

**Founded:** 1970

---

### Principal Business

**Products/Services:** Professional Services; Application Software; Processing Services; Micrographics Services

**Markets Served:** Financial Services; State & Local Governments; Colleges & Universities; Energy Companies; Telecommunications

---

### Financial Information

1987 Company Revenues: \$174.3 Million

1987 CSI Revenues: \$15 Million

1987 Earnings: \$7.6 Million

Net Worth: \$32 Million

Market Valuation: \$80 Million

---

### Organization

Total Employees: 1,900

CSI Employees: Est. 80-100

---

### CSI Activities

**CSI Capabilities:** Consulting; Design/Integration; Project Management; Software Development; Packaged Application Software (Banking/Treasury Applications); Education/Training/Documentation; Service and Repair; Other (Energy Management)

**Areas of Specialization:** Office Automation and Communications; Expert and Decision Support Systems; Financial and Cash Management Systems; Payroll/Personnel Systems; Operations Management

**Strategic Alliances:** IBM (DB2; SQL)

---

### Key Strengths and Weaknesses

**Strengths:**

- Balance between Federal and Commercial Projects
- Focused Marketing (4 Vertical Markets)
- Entrepreneurial

**Weaknesses:**

- No Network Management Capability
- Internal and External Communication
- Few Alliances for IS and Communication Hardware
- Virtually No Presence Overseas

---

**Company: Analysts International Corporation**

**Location:** Minneapolis, MN

**Founded:** 1966

---

### **Principal Business**

**Products/Services:** Professional Services; Application Software (Vertical Market and Cross Industry); Value-Added Remarketer for IBM Minicomputers

**Markets Served:** Banking & Finance; Insurance; Manufacturing; Communications; Electronics; Utilities

---

### **Financial Information**

**1987 Company Revenues:** \$56.7 Million

**1987 CSI Revenues:** \$7 Million

**1987 Earnings:** \$1.4 Million

**Net Worth:** \$9.8 Million

**Market Valuation:** 27.6 Million

---

### **Organization**

**Total Employees:** 970

**CSI Employees:** 50-100

---

### **CSI Activities**

**CSI Capabilities:** Consulting; Design/Integration; Software Development; Education/Training/Documentation

**Strategic Alliances:** CGI (Pacbase)

---

### **Key Strengths and Weaknesses**

**Strengths:**

- Closed Software Division in Order to Concentrate on Professional Services
- Solid Repeat Business
- Technical Breadth of Staff
- Nationwide Branch Office System (14) and Field Offices (10)

**Weaknesses:**

- No International CSI Capabilities
- Limited Project Management Capabilities
- No Network Management Skills

**Company:** ASK Computer Systems

**Location:** Los Altos, CA

**Founded:** 1974

---

### Principal Business

**Products/Services:** Application Software, Professional Services

**Markets Served:** Manufacturing, Finance. Cross Industries: Marketing, Customer Service, Decision Support, Human Resources

---

### Financial Information

1987 Company Revenues: \$98.3 Million

1987 CSI Revenues: < \$2 Million

1987 Earnings: \$8.0 Million

Net Worth: \$82.0 Million

Market Valuation: \$180.3 Million

---

### Organization

Total Employees: 525

CSI Employees: 15-20

---

### CSI Activities

CSI Capabilities: Consulting; Design/Integration; Education/Training/Documentation; Project Management

Strategic Alliances: Acquired NCA Corporation

---

### Key Strengths and Weaknesses

**Strengths:**

- Knowledge of DEC and H-P Computers
- Focus on Manufacturing and Finance Markets

**Weaknesses:**

- Project Management Experience for Large CSI Jobs
- Nothing for IBM World

**Company: Bolt, Beranek & Newman**

**Location: Cambridge, MA**

**Founded: 1948**

---

### **Principal Business**

**Products/Services:** Professional Services, Application Software, Manufactures Advanced Computers

**Markets Served:** Communications; Manufacturing, especially Chemical & Pharmaceutical; Transportation; Banking & Finance; Medical; Services

---

### **Financial Information**

**1987 Company Revenues:** \$233.8 Million

**1987 CSI Revenues:** Est. \$18 Million

**1987 Earnings:** \$3.8 Million

**Net Worth:** \$85 Million

**Market Valuation:** \$326 Million

---

### **Organization**

**Total Employees:** 2,668

**CSI Employees:** 180

---

### **CSI Activities**

**CSI Capabilities:** Consulting, Design/Integration, Project Management, Communication Hardware, Software Development, Education/Training/Documentation, Network Management

**Strategic Alliances:** (Acq.) Network Switching Systems  
(Acq.) Delta Graphics Inc.

---

### **Key Strengths and Weaknesses**

**Strengths:**

- Telecommunications Network Design/Implementation
- Training, Education, Documentation
- Leveraging Federal Government Experience
- Technology Understanding

**Weaknesses:**

- Not Well Known Outside Communications
- Federal Orientation

---

**Company: CAP Gemini DASD, Inc.**

**Location:** Milwaukee, WI

**Founded:** 1975

---

### **Principal Business**

**Products/Services:** Professional Services

**Markets Served:** Manufacturing; Communications/Utilities; Insurance; Banking & Finance; Transportation/Trade; Services

---

### **Financial Information**

**1987 Company Revenues:** \$77 Million (U.S.)

**1987 CSI Revenues:** \$2 Million (U.S.)

**1987 Earnings:** Unknown

**Net Worth:** Unknown

**Market Valuation:** Unknown

---

### **Organization**

**Total Employees:** 1,400

**CSI Employees:** 10

---

### **CSI Activities**

**CSI Capabilities:** Software Development

**Strategic Alliances:** None

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### **Key Strengths and Weaknesses**

**Strengths:**

- Education, Training, Documentation
- Experience in 4GL, DBMS, Laser Disks
- Software Conversion Capabilities

**Weaknesses:**

- Primarily a Software Development Firm
- Limited Experience in Large CSI Projects

---

**Company: Data Architects, Inc.**

**Location: Waltham, MA**

**Founded: 1967**

---

### **Principal Business**

**Products/Services: Professional Services and Application Software**

**Markets Served: Banking and Finance, Life Insurance, Telecommunications**

---

### **Financial Information**

**1987 Company Revenues: \$35 Million**

**1987 CSI Revenues: \$1 Million**

**1987 Earnings: \$2.3 Million**

**Net Worth: \$12.7 Million**

**Market Valuation: Not Available**

---

### **Organization**

**Total Employees: 290**

**CSI Employees: 10**

---

### **CSI Activities**

**CSI Capabilities: Consulting, System Design and Integration, Software Development, Education/Training/Documentation**

**Strategic Alliances: None**

---

### **Key Strengths and Weaknesses**

**Strengths:**

- Telecommunications Expertise
- Knowledge of Burroughs, DEC, IBM, Honeywell, and Tandem Computers

**Weaknesses:**

- Not Well-Known Outside Target Markets

**Company: Oracle Corporation**

**Location:** Belmont, CA

**Founded:** 1977

---

### **Principal Business**

**Products/Services:** Systems Software, Consulting

**Markets Served:** Banking & Finance, Chemical & Pharmaceutical Manufacturers, Automobile Manufacturers, Aerospace, Telecommunications, Energy, Education, Medical, Printing/Publishing

---

### **Financial Information**

**1987 Company Revenues:** \$131.3 Million

**1987 CSI Revenues:** <\$1 Million

**1987 Earnings:** \$15.6 Million

**Net Worth:** \$82.6 Million

**Market Valuation:** \$460 Million

---

### **Organization**

**Total Employees:** 1,121

**CSI Employees:** < 10

---

### **CSI Activities**

**CSI Capabilities:** Consulting, Design/Integration, Education Training/Documentation

**Strategic Alliances:** Interlink Corporation  
Project Software & Development (Project Management Software) Novell Inc.

---

### **Key Strengths and Weaknesses**

**Strengths:** Understanding of DEC, H-P, IBM, PC products  
Support staff of 600 persons worldwide

**Weaknesses:** CSI limited to RDBMS-related projects

**Company: Systems & Computer Techonology Corporation**

**Location: Malvern, PA**

**Founded: 1968**

---

### **Principal Business**

**Products/Services: Professional Services; Application Software**

**Markets Served: State and Local Governments, Education, Associations, Manufacturing, Telecommunications**

---

### **Financial Information**

**1987 Company Revenues: \$42.0 Million**

**1987 CSI Revenues: \$6.5 Million**

**1987 Earnings: \$0.1 Million**

**Net Worth: \$41.0 Million**

**Market Valuation: \$43 Million**

---

### **Organization**

**Total Employees: 900**

**CSI Employees: 50**

---

### **CSI Activities**

**CSI Capabilities: Consulting, Design & Integration; Education/Training/Documentation; Software Development**

**Strategic Alliances: None**

---

### **Key Strengths and Weaknesses**

**Strengths: Communications Expertise  
Knowledge of IBM, Univac, & Honeywell Mainframes  
Focus on 3 vertical markets**

**Weaknesses: Lack of strategic alliances**

---

## COMPETITIVE ENVIRONMENT FINDINGS

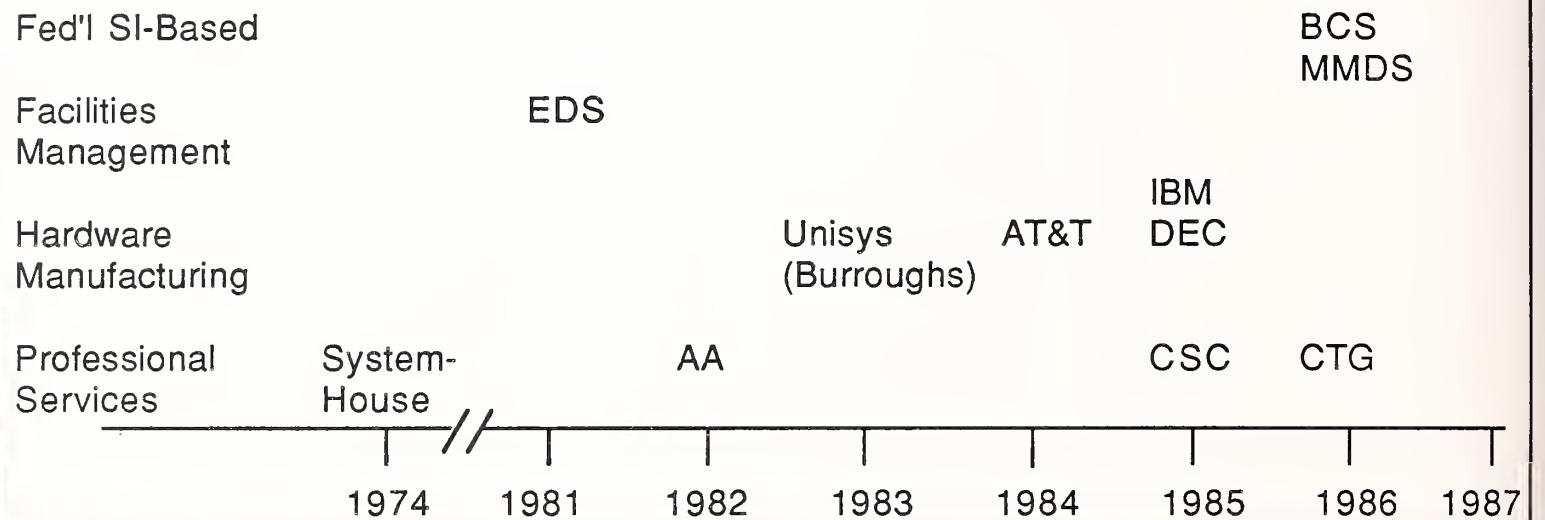


# COMPETITIVE ENVIRONMENT FINDINGS OUTLINE

- Background Information
- Organization Findings
- Customer Base
- Market Share
- Software Development Methods
- CSI Target Markets
- Finding CSI Opportunities
- Vendor Promotional Strategies
- Risk Management Techniques
- Bidding and Pricing Practices
- Competitive Tactics
- Alliance Formation
- Future Directions

## YEAR OF CSI ENTRY BY LEADING VENDORS

### VENDOR CATEGORY



## BACKGROUND INFORMATION

- Average: 3 Years (Consciously)
- Enter CSI Through Vendor Core Skills
- Primary Objective: CSI Revenue & Profit
- Secondary Objective:
  - Follow-On Sales for Hardware Firms
  - FM Operations Contracts for Processing Service Firms
- Exceptions:
  - IBM: Defensive Account Control
  - DEC: Offensive Account Penetration
  - AA & Co.: Offensive Account Penetration

### ROLE OF ACQUISITIONS IN CSI:

- No Vendor has Entered Via Acquisition
- 50% Have Made Subsequent Purchases

### BIGGEST CHALLENGES GETTING STARTED IN CSI

- Corporate Commitment
- Developing Project Management Skills (Hardware Companies)
- Training People to Identify Opportunities

## ORGANIZATION FINDINGS

- CSI Organization Structure:  
95% Matrixed to Accommodate Current Organization
- CSI Opportunity Management
  - 50% One Department
  - 50% Decentralized
- CSI Reporting Relationship
  - Depends on Size of Company
- Sales Organization
  - Special Headquarters Staff for "Services" Vendors
  - Regular Branch Sales Organization for Hardware Vendors and Arthur Andersen
- Marketing Oriented to Verticals; Sales is General Purpose
  - Reason: Immaturity of CSI Market
- Only 30% of Vendors Organize CSI as Separate P & L Center

## **CUSTOMER BASE FINDINGS**

- 50% Of Vendors Have Completed More Than 40 Projects
- Most Vendors Have Done One Project Greater Than \$20 Million (IBM, AT&T, AA, EDS, BCS, CTG)
- Successful CSI Vendors Use Vertical Market Focus
  - Exceptions: IBM & DEC (Diversified)

## **MARKET SHARE BY CLASS OF CSI COMPETITION 1987**

Vendor Class	Percent of CSI Market
Hardware Manufacturers	45
"Big Eight" (CPAs)	21
Professional Services	20
Communications Vendors	6
Aerospace	5
Other	3

## U.S. CSI MARKET SHARE, 1987

RANK	VENDOR	Market Share	
		SALES (\$Millions)	Percent
1	IBM	425	24
2	Arthur Andersen & Co.	225	13
3	Electronic Data Systems	130	7
4	Control Data Corporation	80	4
5	Martin Marietta Data Systems	50	3
6	AT&T	45	3
6	Unisys	45	3
7	CSC	42	3
8	Boeing Computer Services	30	2
9	SHL Systemhouse	29	2
10	Digital Equipment Corp.	27	2
11	GTE	25	1
12	Grumman Data Systems	20	1
12	TRW	20	1
12	AGS Computers	20	1
	Computer Task Group	4	NIL
	Subtotal (top 12 vendors)	1,217	67
	<b>TOTAL MARKET</b>	<b>1,800</b>	<b>100</b>

## OTHER FINANCIAL INFORMATION

- Reported or Estimated Vendor Revenue AAGRs Exceed 30%
- Revenue Sources
  - Current Customers: Hardware Vendors
  - New Accounts: Services Firms
- Everyone Says (or INPUT Estimates) that CSI Business is Profitable in the Aggregate
- Profit Margins for CSI Vary Widely
- Smaller Firms Run the Biggest Financial Risks

# **SOFTWARE DEVELOPMENT METHODS**

- #1 CASE Tools**
- #2 4GLs**
- #3 Code Generators**
- #4 Expert System Shells**

## **CSI TARGET MARKET SELECTION CRITERIA**

- #1 Long-Standing Customer Relationships  
(e.g., AA & IBM)**
- #2 Vendor Expertise**
- #3 Market Size and Growth Potential**
- #4 Criticality of Need**
- #5 Ability to Dominate a Niche**

## FINDING CSI OPPORTUNITIES

#1 Customer Relationships

(Distant) #2 Direct Sales

#3 Invited to Quote on RFP

## CSI VENDOR PROMOTION STRATEGIES

#1 None

#1 Press Relations

#3 Brochures, Newsletters, "Showcases",  
and Consultant Relations Programs

## POSITIONING: CUSTOMER BENEFITS SOLD

#1 Use of Advanced Technology

#2 Reduced Project Risk

#3 Gain Competitive Advantage

- IBM Expert at Selling All Three:

"Implement Advanced Technology at a Reduced Risk to Gain a Competitive Advantage."

## **POSITIONING: SKILLS EMPHASIS**

- #1 Project Management
- #2 Network Management
- #3 Design/Integration

IBM: "TOTAL SOLUTION PROVIDER"

## **POSITIONING: COMPETITIVE DIFFERENTIATION**

- None Established
- Except Arthur Andersen's . . .

**"BUSINESS PROCESS KNOWLEDGE AND SYSTEMS KNOWLEDGE"**

## RISK MANAGEMENT TECHNIQUES

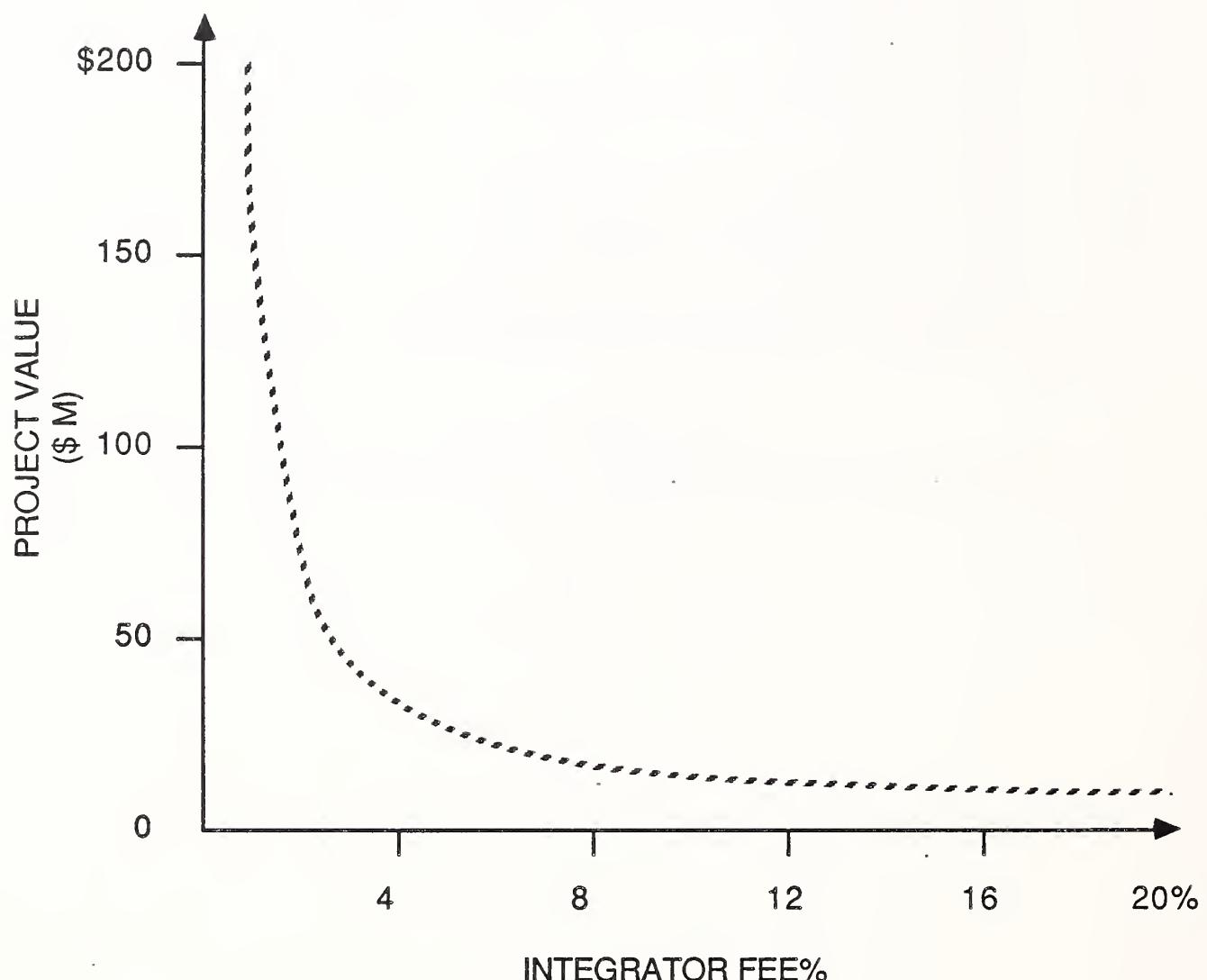
- #1 Project Management Process
- #2 Software Development Tools
- #3 Formal Project Selection Criteria
- #4 Careful Selection of Partners
- #5 Manage Subcontractor Relationships
- #6 Segment Projects

## CSI PROJECT BIDDING STRATEGY

- #1 Avoid Price-Sensitive Deals
- #2 Seek Projects with High Core Skill Content

Note: Average Bid Cost is 4-5% of Total Project Value!

## CSI PROJECT FEES (Estimate )



## PRICING GUIDELINES

- 50% of CSI Vendors Target Profit on All Elements
- Most Claim "Pricing Flexibility" In Creative Sense—Not Price Cutting
- Pricing Driven by Project Circumstances

## SHL MARGIN ANALYSIS BY SERVICE ELEMENT

Service Element	Reasonable Available Profit	Percent of Systemhouse Total Revenues		
		1984	1986	1987
Contract Programming	5%			
Cost Plus Software Development	7%		60%	30%
Consulting	10%			
Fixed Price Software Development	12%			
Hardware/Software Integration	20%		40%	70%
Hardware Integration	10%			

## PRIMARY REASONS FOR . . .

- WINNING CSI COMPETITIONS:

#1. Innovative (Not Necessarily "Proprietary")  
Technology

#2. Full Service Credibility

#3. Client Relationship\*

- LOSING CSI COMPETITIONS:

"Price Too High"

\*Probably More Important Than Reported

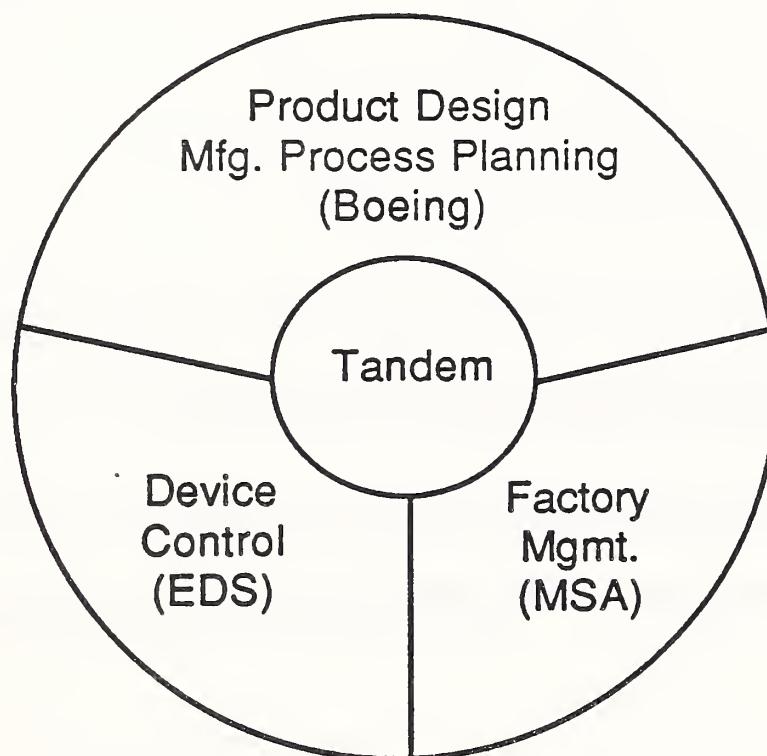
## HOW DO YOU CREATE ALLIANCES?

Percent of Vendors	Response
80	Opportunistic/Project Driven
30	Planned Alliances
30	Formal CSI Alliance Program (IBM, AA, SHL)

(Note: Multiple Responses were Possible)

## **TANDEM INTEGRATED MANUFACTURING ENVIRONMENT (TIME)**

**Integrates: Business Planning, Engineering, and Factory Floor Devices in a Multi-Vendor Environment**



**Boeing Will Market the "Product " as Well**

## **CSI ALLIANCE FORMATION CHARACTERISTICS**

- Highly Dynamic Situation
- Your Competitor Today is Your Partner Tomorrow
- Some "Mariages of Convenience"
- Most are Temporary—Not Long Lasting  
(Except for Hardware Vendors)
- State-of-the-Art Technology Driven Relationships
- Highly Specialized Niche Technology
- Federal Alliances Can Evolve into CSI Alliances

## INDUSTRY ALLIANCE FORMATION PATTERNS

CSI Vendors	Partners					
	Hardware Mfgrs.	Prof. Services	Comm. Companies	Aerospace	Big "8"	Software Cos.
Hardware Manufacturers		X	O			X
Professional Services	X		O			X
Communications Companies	X			O		O
Aerospace	X		O			O
Big "8"	X					O

### Interpretation Key:

- For CSI Vendors, Read Horizontally: "What Partners do I Need?"
- For Partners, Read Vertically: "Who Needs Me?"

### Legend:

X = Most Important and Frequent Alliances

O = Occasional Alliances

## FUTURE DIRECTION, NEAR-TERM

- Foremost: Establish Separate CSI Organization
- From Opportunistic to Planned Targets (Marketing)
- Increase Quantity & Quality of Tactical Partnerships
- Reduce Risk Through:
  - Better Project Management Software
  - Leveraging Prior Experience ( Packaged Solutions)

## FUTURE DIRECTION, LONG-TERM

- From Strategic Partnerships to CSI Joint Venture Firms
- Develop Products and Services Strategy
  - Specialized vs. Full-Line
  - Industry Specialization
  - Hardware Specialization
  - Software Specialization
- AI-Based Risk Management and Project Management Techniques
- Increased International Business



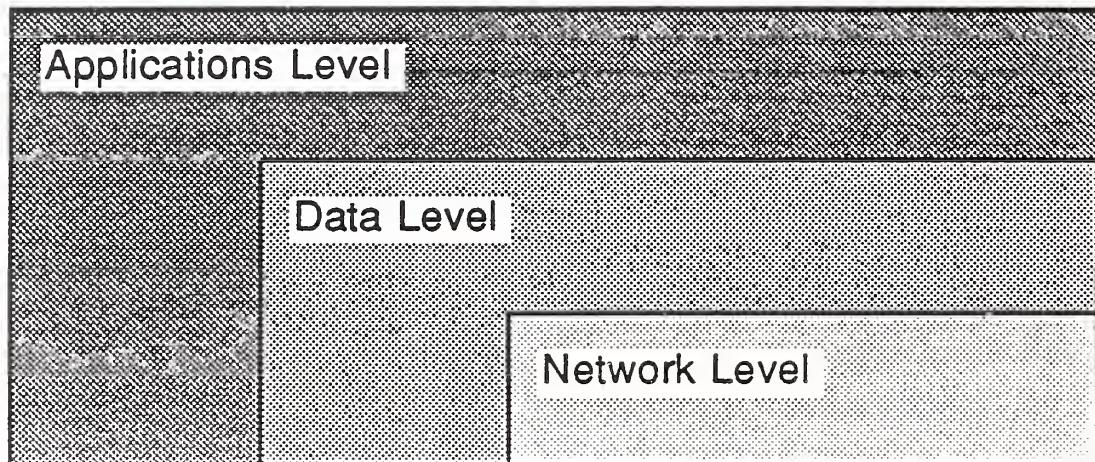
## MULTI-VENDOR INTEGRATION TECHNOLOGIES



## INTRODUCTION: MULTI-VENDOR INTEGRATION TECHNOLOGIES

- Hierarchy Of Integration Products
- Systems Integrator Capabilities
- Multi-Vendor Integration Products & Tools
- The Evolution of Multi-Vendor Integration Tools
- Conclusions

## HIERARCHY OF INTEGRATION TECHNOLOGIES



- Different Products At Each Level
- Software & Methodology At Highest Level
- Hardware & Software At The Lowest

## **EXAMPLES OF PRODUCTS AND STANDARDS**

### **APPLICATIONS LEVEL**

- Foundation - Arthur Andersen
- Concept 90 - Deloitte Haskins + Sells
- CIM Products

### **DATA INTEGRATION LEVEL**

- Oracle, Sybase (Distributed DBMS)
- Data Dictionary/Definition Products
- Emerging SQL Standards

### **NETWORK INTEGRATION LEVEL**

- Non-IBM SNA Connectivity Products
- LAN and WAN Bridging Technologies
- Protocol Convertors

## **VENDOR CAPABILITIES**

### **PROFESSIONAL SERVICE COMPANIES**

- Focused On Methodology
- Developing Applications Expertise Across Multiple Hardware Vendors

### **SOFTWARE/HARDWARE VENDORS**

- Focused On Infrastructure
- Expertise In Network-Based Solutions
- Starting To Develop Vertical Applications Expertise

## SAMPLE CSI VENDOR INTEGRATION TECHNOLOGY LINKS

CSI VENDOR	ALLIANCE/LINK	INTEGRATION CAPABILITY
IBM	Network Equipment Tech. Policy Mgt. Systems Hogan Systems	T1 Multiplexors Insurance Applications Software Banking Applications Software
DEC	Apple Network Innovations	Micro-Computer Hardware/Software Micro Software Link (Cooperative Processing)
Arthur Andersen	IBM MSA, McCormack & Dodge FOUNDATION	IS Hardware Financial Software Internally Developed CASE Product
EDS	Tandem AT&T Decision Systems	IS Hardware/Software/Communications Communications Systems Software
SHL Systemshouse	Wang Northern Telecom Oracle	IS Hardware, Communications Communications Systems Software/Database
AT&T	Sun Microsystems	Network Hardware, NFS (Network File System)
Martin Marietta	Hoskyns (UK) Hewlett-Packard	Applications Software Applications Software
UNISYS	Dravo Auto. Sciences Industrial Networking Timeplex	Software Integration/Manufacturing MAP Protocol Communications Hardware/Software
CTG	Relational Technology TransForm Logic	Systems Software/Database CASE Tool

**MULTI-VENDOR INTEGRATION  
SAMPLE PRODUCTS/TOOLS  
GATEWAYS/BRIDGES**

VENDOR	PRODUCT	CONNECTIVITY
Advanced Computer Comm.	ACS 420 Ethernet	Ethernet to X.25
Banyon Systems	BNS Network Server	Interconnect Various LANs
Bridge Communications	GS/3	Any XNS to TCP/IP
Communications Solutions, Inc.	Access SNA/APPC	Any Workstation to SNA
Digital Communications	IrmaLAN DFT	Any IBM-Compatible BIOS To SNA
Novell	NETWARE	LAN Network To SNA
ORION Network Systems	SNA 6.2 Release 3 Gateway	Any Workstation To SNA
Rabbit Software	RABBITGATE	IBM NETBIOS to SNA
3Com	3+/Asynchronous	3COM, or IBM Token Ring To Any Asynch. Host
Ungerman-Bass	NET/One X.25	U-B 802.3 NET/One to X.25
Wang Laboratories	SNA Networks	WANG VS Mini to SNA

**MULTI-VENDOR INTEGRATION  
SAMPLE PRODUCTS/TOOLS  
MICRO TO HOST**

VENDOR	PRODUCT	TYPE	CONNECTIVITY
Communications Research Group	BLAST	Cooperative Processing	All Mini Computers Mainframes, Asynch
Communications Solutions	ACCESS/SNA	Cooperative Processing	Any IBM 370 Architecture
Digital Communications	IRMA2	COAX, Terminal Emulator	IBM 3270
Lee Data Corp.	Series 8000/ Execulink	Protocol Converter	IBM 3270
Micom Systems	MICOM Box	Protocol Converter	IBM 3270
Novell, Inc.	PCOX/COAX	COAX Terminal Emulator	IBM 3270
TangramSystems Corp.	ARBITER	Cooperative Processing	Any IBM 370 Architecture
Walker Richer & Quinn	Reflection 2 Plus	Terminal Emulator	Any DEC and UNIX

**MULTI-VENDOR INTEGRATION  
SAMPLE PRODUCTS/TOOLS  
ETHERNET LANS**

VENDOR	PRODUCT	TYPE
AT&T	STARLAN	Unshielded Twisted Pair
Banyan Systems	CNS	Coax, Thin Coax, Unshielded Twisted Pair
Bridge Communications	PCS/1	Coax, Unshielded Twisted Pair, Fiber Optics
Novell, Inc.	NE1000	Coax, Thin Coax
SynOptics	LattisNet	Unshielded Twisted Pair
Sytek, Inc.	LocalNet 4000	Coax, Thin Coax
3Com Corporation	3S-400	Coax, Unshielded Twisted Pair
Ungerman-Bass	NET/ONE	Coax, Unshielded Twisted Pair, Fiber Optic

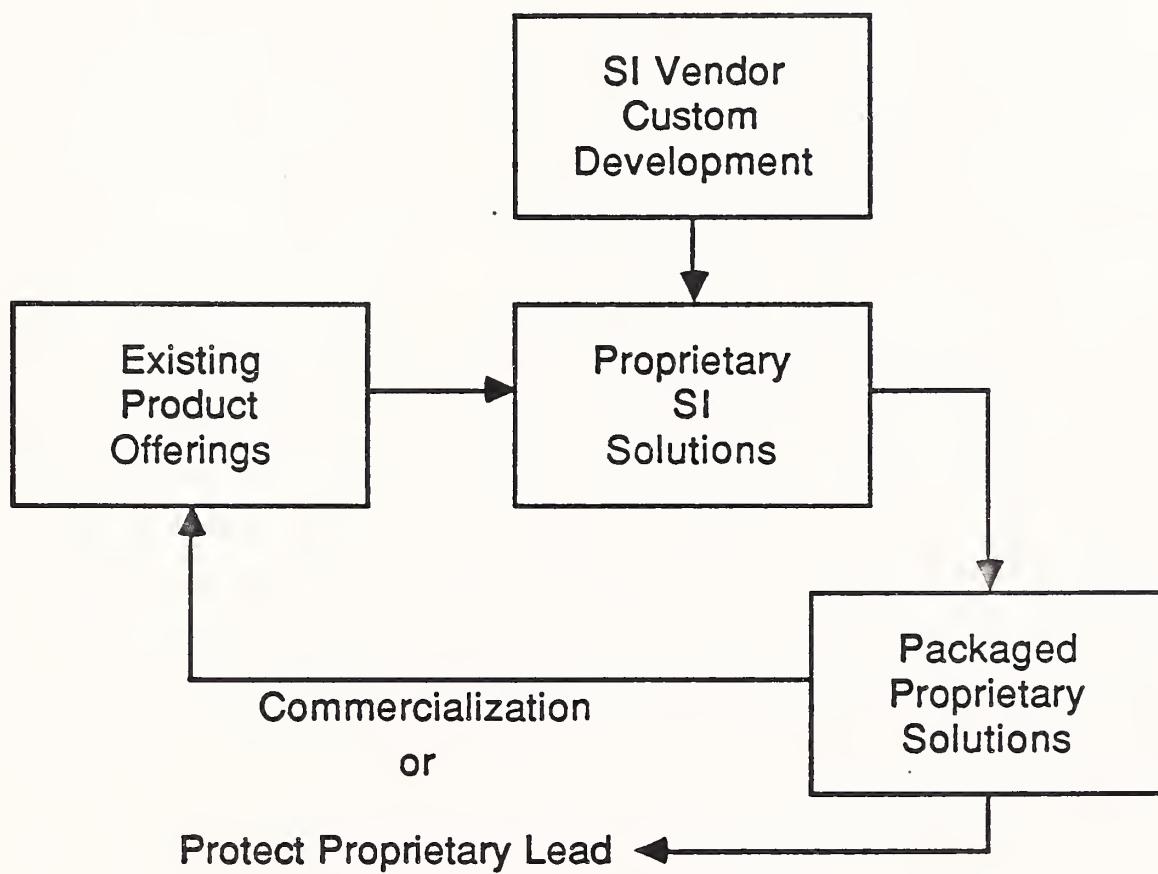
**MULTI-VENDOR INTEGRATION  
SAMPLE PRODUCTS/TOOLS  
T1 MULTIPLEXORS**

VENDOR	PRODUCT	APPLICATION
BBN Communications	T-500 CSU	Network, Dynamic Routing
CODEX Corporation	6290	Point-to-Point And Network, Dynamic Routing
Digital Communications	9000 Series Netlink 7000	Network, Dynamic Routing Point-to-Point, Table Routing
General Datacomm	MegaMux MegaSwitch	Point-to-Point, Table Routing Point-to-Point And Network, Dynamic Routing
Network Equipment Technologies (NET)	IDNX 20, 70	Point-to-Point And Network, Dynamic Routing
Timeplex, Inc.	Link/100	Point-to-Point And Network, Dynamic Routing

## TRENDS IN MULTI-VENDOR INTEGRATION

- No Vendor Has A Complete Tool Set To Accomplish SI At All Three Levels
- Most Vendors Focusing on Particular Niches Or Levels
- Expertise and Bridging Technologies Gained Through Alliances
- Each New Project Benefits From Previous Experience

## THE EVOLUTION OF SYSTEMS INTEGRATION TECHNOLOGIES





## NTT CSI STRATEGY RECOMMENDATIONS



# NTT CSI STRAGEGY RECOMMENDATIONS

Separate Report and Presentation





